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ABSTRACT

The purpose of this report is to facilitate decision making concerning attendance at the many concurrent sessions of the 1992 conference of the Pacific Telecommunications Council (PTC). The report augments the collection of full length papers submitted in time for publication in the PTC '92 Proceedings by providing summaries for concurrent sessions. The conference focused on challenges of regional integration of telecommunications with a special interest in communications satellites. Many of the papers focus on the world's major communications satellite providers, innovative applications for satellite services, technical explanations of satellite capabilities, and proposals for new satellite networks. Attention is also directed toward mobile communications which offer opportunities to augment many nations' limited telecommunications infrastructures and to meet new demands throughout the Pacific region. Policy considerations, the implications of regulatory frameworks, information networks and systems, observations on strategic alliances, and insights on investment and financing are other concerns highlighted at PTC 1992. Summaries are indexed by subject, country, and author. (DB)

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Session Summaries

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Pacific Telecommunications Council Fourteenth Annual Conference

PTC'92

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January 12–15, 1992

Sheraton Waikiki Hotel ▼ Honolulu, Hawaii

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PTC' 92

SESSION SUMMARIES

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INTRODUCTORY NOTE

These concurrent session summaries and accompanying indexes provide an easy reference guide to PTC'92. The purpose of this guide is to facilitate decision making concerning attendance at the many concurrent sessions.

This guide supplements the more inclusive listings of conference events found in the **PTC'92 Program** and augments the collection of full-length papers submitted in time for publication in the **PTC'92 Proceedings**. The summaries provided here are only for the concurrent sessions; they do not cover the plenary sessions, interactive working groups, and workshops, which are listed in the program.

The numbering system for the **Summaries, Program,** and **Proceedings** is consistent throughout. to explain the numbering system used: the first digit references the day of the conference; the second digit references the time block during the day's schedule; the third digit references the concurrent session; and the fourth digit references the presentation within the concurrent session.

Because of publication deadlines, the summaries and accompanying indexes necessarily relied upon pre-conference submissions. To augment the sometimes generalized information provided here, please refer to the **Proceedings** and check the program addenda and daily conference bulletins for late changes and additions.

The concurrent sessions are indexed by subject, by country, and by author. The three indexes provided for **PTC'92** are located following the summaries.

PTC gratefully acknowledges support received from IBM Corporation that made possible this edition of the **PTC'92 Session Summaries**.

Mark D. Lofstrom
Editor

2.2.1 *Strategic Alliances and Joint Ventures: Cooperation and Competition in the Telecom Marketplace*

Chair: **Kenneth Volz**, Vice President, Strategic Investments, Ameritech International, USA

2.2.1.1 *Cooperation and Competition: The Role of Strategic Alliances in the Trend Towards Globalisation*

David Gibbs, Senior Engagement Manager, McKinsey & Company, Australia

The speaker addresses the growing debate surrounding globalization of carriage of telecommunications traffic. Of special concern is the impact of competitive pressures on the emergence of strategic alliances involving domestic telecos that operate in a legislative framework that typically stresses cooperation with other national telecos. Examining the telecommunications industry's oscillation between cooperation and competition, the speaker also outlines how the success or failure of strategic alliances may determine whether an apparent trend toward globalization can be successfully realized.

2.2.1.2 *Joint Venture or BOT: The Choice for Telecommunications Development with Foreign Investment*

John K. Slaughter, Director of Business Development, Asia Pacific, Cable & Wireless plc, Hong Kong

The speaker presents a framework for comparative evaluation of joint ventures and build-operate-transfer (BOT) agreements. Both options increasingly involve foreign companies in the development of telecommunications infrastructure in Asia Pacific nations. He sets forth four main reasons why nations or corporations in the Asia Pacific region consider such options--to conserve scarce financial resources, to gain advanced expertise, to secure international competitive advantage, and to avoid adverse international trading pressures. Applying these concepts he outlines the benefits and risks inherent in such programs given various regulatory, financial, and legal environments influencing such decisions.

2.2.1.3 *The North Pacific Cable - Charting a Course for International Alliances*

David Walker, Vice President, Engineering and Operations, Pacific Telecom Cable, Inc., USA

The international alliance responsible for the first direct US-Japan fiber optic link is the subject of a case study on such arrangements. The speaker covers such topics as the negotiations for ownership shares, the role of the alliance in the participants' long-term strategic objectives, contributions in addition to financial commitments needed for success, and the critical roles of consensus, respect for linguistic and cultural differences, and an awareness of the impact of regulatory bodies and competitive pressures.

2.2.1.4 *Strategic Alliances in International Telecommunications: Implications for the Pacific Region*

Maurie O'Connor, General Manager, International Business, and **Danny Maurice**, Group Strategy Manager, OTC Limited, Australia

Reviewing the competitive factors in international telecommunications, the speakers focus on different company-specific strategic alliances between carriers. They argue that while alliances to provide integrated services on a global basis seem to predominate, regional alliances in the Pacific region are particularly appropriate.

2.2.1.5 *An Enabling Strategy for Telecommunications Development*

Edward B. Dinan, Vice President and Chief Financial Officer, NYNEX Worldwide Services Group, USA

NYNEX's experience in build-operate-transfer projects provides a basis for enumerating financial considerations supporting such endeavors. The speaker discusses the mutual benefits of such projects given an environment of scarce capital available for investment in an overabundance of telecommunications development proposals being advanced internationally.

2.2.2 *Technical Aspects of Network Design*

Chair: **Delbert Smith**, Partner, Schnader, Harrison, Segal & Lewis, USA

2.2.2.1 *Graphical Communication Network Simulator*

H.W. Chan, Lecturer, University of Hong Kong, Hong Kong

Limitations in the use of mathematical analysis to study different routing and flow control schemes in computer communications networks led the speaker to develop a graphical approach to network simulation. The speaker presents details on the analytical components used and study results obtained with a user friendly system interface that allows greater flexibility and a shortened cycle for the design of computer communications network systems.

2.2.2.2 *Various Methods of LAN-WAN Connection*

Satoru Urata, Network Engineer, Information Network Engineering Department, Fujitsu Limited, Japan

The speaker analyzes various methods of LAN-WAN connection from two viewpoints: the type of gateways connecting LANs to WANs, and the kinds of WANs that use inter-LAN connections. Included in the analysis are principles for selecting among various available gateways and choosing appropriate lines for the LAN-WAN connection.

2.2.2.3 *Switching of a Request Towards a Destination Address According to its Semantic Contents*

Jean Jacques Mercier and **Laurence Redon**, Informatics and Communication Research Team, University of Toulouse, France

The speakers present a proposal to insert between the transport and network layers of ISO 7-layer intelligent networks, also known as semantic transfer networks, a localization algorithm that allows users to quickly find the destination address of working-stations best-suited to perform any expected service. They discuss studies conducted on the implementation of such an algorithm; the studies were based on tests conducted on a bureaucracy network to locate given software on the network.

2.2.2.4 *Synchronizing the Evolving Network*

Rob Avery, Marketing Manager, Telecom Solutions, USA

Network synchronization, the background technology enabling efficient provision of digital communication services, presents many challenges including expense, time-costly maintenance, and integration of higher quality digital synchronization demanded by new industry guidelines, services, technologies, and topologies. The speaker identifies four steps that are vital to meeting the fundamentally critical network timing elements needed to effectively address these challenges. He provides a strategic overview of the means of planning and utilizing the latest in timing mythology and technology in network synchronization.

2.2.2.5 *Architecture for a Large-scale Digital Mobile Communications Network*

Mitsuaki Hanaoka, Senior Engineer, **Akihisa Nakajima**, Senior Manager, and **Fumio Kondo**, Senior Manager, Mobile Communications Division, Nippon Telegraph and Telephone Corporation, Japan

Explosive demand for mobile communications and concurrent development of ISDN in fixed networks make it even more important that the technical framework for digital mobile networks accommodate needs for increased capacity and flexibility. The speakers review the architecture and functional capabilities of a large scale digital mobile network being introduced by NTT for transit-stage service in 1992 and subscriber-stage service in 1993.

2.2.2.6 *Voice Enhanced Applications Enabled Through the Use of an Application Program Interface*

Daniel E. Stone, International Market Support Consultant, IBM Communications Industry, USA

2.2.3 *Country Studies: Telecommunication Developments*

Chair: **Arbis Shipley**, President and CEO, Hawaiian Trans/comm, USA

2.2.3.1 *Rural Telecommunication Services in Malaysia*

A.R. Tharek, Head of Communication Engineering Department, University of Technology Malaysia, Malaysia

The experience of rapidly developing Malaysia provides insights into solutions for rural telecommunications development. To meet the challenge, this ASEAN nation is installing a cellular network infrastructure. The goal is to provide community phones that bring telecommunications services within reach of rural populations.

2.2.3.2 *Papua New Guinea - Telecommunications Network Development*

N. Mobiha, Senior Technical Instructor, Department of Electrical Engineering, Unitech, Papua New Guinea

The speaker describes the development of PNG's telecommunications network and gives an overview of expected developments in the near future. While many third world nations are still struggling to construct a basic network, PNG is investing in network upgrades. The national network boasts 51 automatic exchanges and more than 31,000 lines interconnecting all major towns; international links through the Australia-PNG submarine cable, an INTELSAT earth station scheduled for upgrading, and a digital gateway exchange routing all international traffic; and plans in 1993 to begin operations of a domestic satellite network (DOMSAT).

2.2.3.3 *Satellite 'Cellular' Telecommunications User, My Experiences and Problems in a Mobile Society Improves the Pacific Hemisphere Cultural Growth and Development*

Angel A. Navarro, President/CEO, and **Marcela Z. Navarro**, Remote Sensing Associate, Remote Sensing Division, Gabun-Paracale Mining Co., Inc., Philippines

The speakers stress the important social and cultural impact of satellite communications in remote and urban areas of the Pacific. Developments seen to have particular significance are INMARSAT's decision to extend services to land mobile users, introduction of GPS and European Locstar systems, and applications of mobile satellite cellular to provide access to technical information and disaster reporting and assessment. The speakers focus on remote sensing information gathering systems made possible by continued developments in the region.

2.2.3.4 *New Opportunities in Australian Telecommunications*

Andrea Grosvenor, Acting Director, Regulatory Policy, Telecommunications Policy Division, Department of Transport and Communications, Australia

Government policies aimed at establishing a more open, pro-competitive regulatory environment went into effect in Australia last year. The speaker appraises the opportunities for both the industry and users that are being engendered by the liberalized regulatory policy, which is aimed at increasing activity by carriers, service providers, and equipment suppliers.

2.2.3.5 *Hong Kong's in Need of a TCP/IP Internet*

Aaron Y.T. Cheung, Director of Research, HK Internet E&S, USA

Regional computer networks are key elements to providing timely communication resources to scientists and engineers and to enabling collaborations between research labs to flourish. Global Internet, a supernetwork composed of more than 2,500 local and regional area networks interconnected through international leased lines, provides a prototype for development of a Hong Kong-based Internet proposed by the speaker.

2.2.3.6 *Telecommunications 2000 in Korea: Videotex Trial and a Sociocultural Interpretation of Informationalization of Society*

Gwang-jub Han, Assistant Professor, University of Wisconsin, USA, and **Woo-Hyun Won**, Professor, Korea University, Department of Mass Communication, Republic of Korea

The speakers provide a summary of various aspects of Korea's ambitious plans to capitalize on development of its domestic telecommunications and information industries during the coming decade. Government investments worth US$70 billion are planned to help Korea achieve various export-oriented initiatives that aim to allow Korea to capture a five percent share of the world information industry market by 2000 and to sustain annual growth rates ranging from 8.7 to 10.2 percent for the domestic industry. Additional investments in domestic infrastructure and technical education resources are also planned.

2.2.4 ***Convergence of Communication Technologies: Voice/Data/CATV/Etc.***

Chair: **Karl Rossiter**, Business Development Manager, Television New Zealand, Ltd, TVNZ Enterprises and Business Development, New Zealand

2.2.4.1 *Three Men in a Tub*

Robert E. Button, President, American TransCommunications, Inc., USA

The proverbial "three men in a tub" who are the subject of this presentation are the telcos, the cable TV industry, and the electric utilities. They ride rudderless on a sea of regulation, each competing to guard and expand profits through use of new technologies, each eager to access and potentially raid the others' broad customer base. The speaker looks at creative business and service combinations and the obstacles to regulatory rationalization that would allow them to occur in these three industries that share converging motives, technologies, and business ambitions.

2.2.4.2 *The New Rules for Wide Area Networking: Low-cost remote integration of data/voice/fax/lan*

Kenneth R. Guy, Vice-President Corporate Strategy and Business Development, MICOM Communications Corp., USA

Wide-area networking (WAN) products are changing the way Pacific Rim businesses communicate with remote offices. These products, called Data/Voice Network Servers, integrate remote data, voice, fax and LAN communications over low-cost 9.6 Kbps to 56/64 Kbps lines. In order to help communications professionals learn what they need to know to keep on top of one of the 1990's most significant networking advances, the speaker discusses concepts behind and applications for four bandwidth-saving techniques used to integrate data, voice, fax and LAN communications on low-cost, lower-speed lines: fast packet multiplexing, data compression, speech compression, and facsimile demodulation.

2.2.4.3 *The Impact of New Broadcasting Technologies on Development*

Richard L. Nickelson, Senior Counsellor, Head of Technical Department (Broadcasting), International Radio Consultative Committee (CCIR), ITU, Switzerland

The speaker analyzes the impact of new technologies on the development of broadcasting and the ways in which regulatory and legal concerns will influence the rapidity with which technological innovations effect real change, particularly in small and developing countries. Accompanying perfection of new technological capabilities, the speaker notes, will be the rearrangement and renewal of production distribution and broadcasting facilities. This will lead to changes comparable to those following the introduction of FM broadcasting and color television. Among the technological advances discussed are HDTV; direct satellite sound broadcasting to home, portable and mobile receivers; digital sound broadcasting; personal messaging and microcomputers; and fiber optic and ISDN networks.

2.2.4.4 *The Possibility of the Unified Legal Infrastructure on Electronic Information Transfer (Communications in General)*

Nobuhiko Shimasaki, Corporate Chief Engineering, **Mitsuo Kajitani**, and **Susumu Shirasawa**, NEC Corporation, Japan

The legal framework for communications is increasingly at odds with the trend toward unification and integration of broadcast and radio wave transmissions, on the one hand, and optical fiber transmission through public service end-user connection interfaces typically provided by the telcos and cable TV industry, on the other hand. The speaker reviews the discrepancies between the legal and technological dynamics in the industry. He then proposes a set of possible descriptive specifications for electronic information transfer services that could serve as the basis for a unified legal framework.

2.2.4.5 *Integrating Fiber Optics into the New Towns of the 21st Century*

Thomas A. Reiman, Executive Vice President, Live Oak/Sutter Bay, USA

Of special note is the impact that new towns will have on successful introduction of mass market integrated voice, data, and video services. The speaker discusses two pilot projects in the US that involve cooperation between the telephone and cable television industries to provide broadband ISDN to homes, businesses, and academic institutions. He reviews the marketing impact of ISDN and digital switched video services and the implications of such developments for other areas within the Pacific region.

2.2.5 ***Utilization of Satellite Systems: Business and Program Considerations***

Chair: **Felipe Noguera**, Secretary General, CANTO, Port of Spain, Trinidad & Tobago

2.2.5.1 *The Commercialization of Space*

Linda M. Rankin, Vice-President Business Development, Telesat Canada, Canada

A growing portfolio of high-quality voice, data, and video services are transforming Telesat, Canada's domestic satellite service, from a transmission service provider to an applications service provider. Based on Telesat Canada's experience, the speaker discusses how reconceptualizing three fundamental concepts regarding satellites has led to a new understanding of the comparative advantages of satellite and terrestrial transmission. These reconecived ideas now inform the provider's changing view of its role in the industry and ways it fits into the lives of its users.

2.2.5.2 *Strategies for Market Entry by International Separate Systems*

Robert M. Freidan, Esq., Adjunct Associate Professor, The George Washington University, USA

This presentation focuses on PanAmSat as a model for the entry of separate systems into the market for international satellite services long dominated by INTELSAT. Initially advocated by the US government, the idea was vigorously opposed until the US attempted to abate potentially adverse consequences of competition by prohibiting separate system access to the public switched telephone network (PSTN) and by requiring long-term contractual relationships. The speaker discusses the strengths and weaknesses of the PanAmSat provocateur model, comparing it to MCI Telecommunications, Inc. in the domestic arena. He considers alternate models with an eye toward identifying whether and how competition in international satellite services can enhance consumer welfare.

2.2.5.3 *Satellite Program Distribution in the Pacific*

Veronica M. Ahern, Partner, and **Albert Shuldiner**, Associate, Nixon, Hargrave, Devans & Doyld, USA

One of the primary obstacles to satellite program distribution in the Pacific is the availability of satellite and transmission capacity at reasonable prices. The speakers argue that this problem can be solved through the introduction of additional satellite systems. They review existing and planned systems that could be used for distribution of video programming.

2.2.5.4 *Satellite Data Broadcasting System*

Toshiro Mizokuchi, Electronics Engineer, and **Kochi Yamakawa**, Fujitsu Limited, Japan

In Japan, two private companies provide communication satellite services for video distribution and private corporate networks. Fujitsu, having already built its own video transmission network utilizing a transponder leased from one of the companies, is now developing a Satellite Data Broadcasting System useful for multimedia distribution. The speaker highlights the challenges Fujitsu encountered in developing this system and the solutions the company found for them. These include: affordable and compact receiving units with universal interface capabilities; data transparency achieved with a multi-layer OSI architecture in order to allow for the transmission of many different types of information; and the ability to transmit data to many users simultaneously, which Fujitsu solved by using a 2Mbps packet transmission system that enables four systems to be carried efficiently over a single transponder.

2.2.5.5 *Regulatory and Business Considerations in the Implementation of Satellite Sound Broadcasting*

Noah A. Samara, Chairman and CEO, Worldspace, Inc., USA

Implementation of DBS for radio (DBS-R) is scheduled for discussion on the agenda of WARC 1992. The speaker addresses the technical, regulatory, and business considerations behind this pending WARC agenda item. He describes the technical implementation scenarios World Space has examined for a low-cost DBS-R service it is developing, the frequencies providing the best regime for the service, and business policies relating to satellite sound broadcasting.

2.2.5.6 *The Growth of Satellite News Gathering (SNG) Services in Japan: Equipment, Applications, and Special Technical Facilities to Aid SNG Utilization*

James G. Beitchman, General Manager, System Engineering Department, Japan Communications Satellite Company, Inc., Japan

The Gulf War and natural disasters such as the eruption of Mt. Unzen in Japan have demonstrated the social, economic, and political importance of SNG, one of the most important and publicly felt aspects of satellite telecommunications. The speaker reviews the growth of SNG services in Japan, particularly since the introduction there in 1989 of high power Ku-band satellite services. He also describes two technical facilities recently installed by Japan Communications Satellite Company (JCSAT) to facilitate SNG communications. One is JCSAT's Livecom orderwire service connecting SNG and TV operations stations. The other is JCSAT's Transponder Reservation System (TRS) providing a computer-based automatic transponder booking and billing system for both SNG and short period users.

2.2.6 ***Telecommunications and the Travel Industry: Vital Linkages***

Chair: **Kenji Saga**, Professor, International Telecommunications, Faculty of International Relations, Asia University, Japan

2.2.6.1 *A Communications Platform for Road Traffic Management Systems*

Darryl F. King, Account Executive Transport & Education, Australian Telecommunications Corporation, **Paul Gale**, and **Maxwell G. Lay**, Director - Technical Resources, VIC Roads, Australia

The speakers report on a study undertaken by Telecom Australia's Corporate Customer Division as part of a Transport Management Information Systems (TRIMS) agreement between Vic Roads and Telecom. The purpose of the study was to assess performance of Vic Roads existing operating systems, analyze its future communication requirements, and reccomend selection of communication platforms to meet the company's current and future needs.

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2.2.6.2 *A New Traffic Information Service Delivered Over the Cellular Mobile Phone Network*

Yukio Ouchi, Research Engineer, **Seiji Suzaki**, Engineer, NTT Communications and Information Processing Laboratories, **Toshio Nishiyama**, Associate Manager, NTT Kansai Regional Headquarters, and **Masanobu Higashida**, Research Group Leader, NTT Communications and Information Processing Laboratories, Nippon Telegraph and Telephone Corporation, Japan

The speakers present a prototype being developed for a traffic information delivery service offered through an existing cellular mobile phone system. Requiring a comparatively small initial investment, the prototype features personalized information provided on real-time at low cost and a large capacity accessed through telephones, usually car phones. Demonstrations identified three areas where refinements are now being made: the need for an algorithm to forecast the quickly developing changes in traffic patterns that result from access to the system; efficient input equipment compatible with existing cellular mobile phone systems; and perfection of existing voice synthesis techniques.

2.2.6.3 *The Airline Industry: Major Customer and Innovator on the Thin Routes of the Pacific*

Daniel C. Smith, Manager of Telecommunications, Air Marshall Islands, Marshall Islands

Despite their size, almost all Pacific nations have a national airline requiring advanced data communications in order to compete in the international air services market. Maintaining such communications represents a major expense for these airlines, which are often a prime customer of the nation's communications provider or PTT. The speaker cites examples of favorable government policies and innovations that recognize that the health of a nation's travel industry depends on provision of needed services at fair prices. He also discusses new approaches to providing reduced-cost computer reservations systems (CRS) via point-multipoint use of satellite circuits serving thin routes in the central Pacific.

2.2.6.4 *Tourism in a Global Context: The Case of Frequent Traveler Programs*

Hamid Mowlana, Professor and Director, and **Ginger Smith**, Research Associate, International Communication Program, School of International Service, The American University, USA

Frequent traveler programs increasingly involve the international tourism industry in areas of technology transfer and international trade in services. Consequently, governments, international organizations, and tourism policymakers find that contemporary international relations include a number of emerging agenda items related to telecommunications applications in the global tourism industry. The speakers use frequent traveler programs as a case study to illustrate issues such as the impact of telecommunications on transnational business, the convergence of service agreements, and how regulatory barriers affect travel service providers' ability to compete in a global marketplace.

2.2.6.5 *The Future of Telecommunications and the Travel Industry: The Case of Hawaii 1991-2006*

Alice Chan Plummer, Graduate Assistant, Department of Communication, University of Hawaii, USA

An overview of existing IT applications in the global tourism industry, the changes they have effected, and policy issues they raise provides the backdrop for the speaker's forecast of telecommunications travel and trade (Triple-T) in Hawaii during the next 15 years.

2.2.7 ***Pacific Rim Telecom Status Report: Privatization and Competition Strategies in Mexico and Lands Down Under***

Chair: **Michael D. Erony**, Ph.D. and Principal, Erony, McKibben & Associates, USA

2.2.7.1 *South of the Border, Down Mexico Way*

Ronald W. Symes, Executive Vice President, International Development, Southwestern Bell Corp., USA

The speaker reports on Southwestern Bell International's participation in the privatization of Telefonos de Mexico (Telmex). Included in the report are details about operational participation and plans for future investment and upgrades of the telecommunications infrastructure.

2.2.7.2 *Pacific Rim Telecom Status Report: Privatization and Competition Strategies in Mexico and the Land Down Under; "The Promise and the Challenge"*

David Frost, Vice President, Bell Atlantic International, Inc., USA

Driven by the need to extend basic service coverage to support economic and social development, countries are not only modernizing their telephone networks but coming to believe that privately-owned telephone companies, not governments, are best positioned to develop and expand the telecommunications infrastructure. The speaker describes how Bell Atlantic International, Inc., a co-owner of Telecom Corporation of New Zealand, has been involved as consultant, software and systems integrator, and joint venture partner with leading telephone administrations and cellular consortia.

2.2.7.3 *(title tba)*

John Lawrence, Business Development Manager, Hutchison Telecommunications (Kalori Communications Group), Australia

2.2.7.4 *Competition in Australia - A Winning Perspective*

David Lawrence, OPTUS Communications, Australia

The process of micro-economic reform in Australia led to the government offering its domestic satellite carrier for sale with a second carrier license attached. The speaker covers the background, the process of bidding, and the future plans of Optus Communications for building its infrastructure and providing competitive service in Australia.

2.3.1 ***Economic Integration and Regional Developments: The Role of the Telecom Sector***

Chair: **Teresa Buczkowska**, School of Electrical Engineering, University of Technology, Sydney, Australia

2.3.1.1 *The Major Investments Trends in the World Public Telecommunications*

Bernardo Helio Schneiderman, Manager, Marketing & Sales, Satellite Technology Management, USA

Continued liberalization of domestic telecommunications regulation has led numerous countries to make ambitious commitments to infrastructure investments as well as to policies aimed at facilitating the entry of their national carriers into the global marketplace. The speaker examines the profile of telecommunications investment in nine countries that view expansion of their domestic networks as being beneficial to international competitive advantage: Brazil, Mexico, France, Germany, Italy, Australia, Japan, South Korea and Taiwan.

2.3.1.2 *Global Telecommunications Standardization and Regionalism*

Meheroo Jussawalla, Research Associate/Economist, Institute of Culture & Communication, East-West Center, and **David Lassner**, Director of Information Technology, Office of Information Technology, University of Hawaii, USA

The considerable expense and time required for active and meaningful participation in standard setting activities places developing nations at a practical disadvantage. The opportunity costs of developing countries' participation frequently involve access to the expertise of a limited number of qualified professional whose skills

are needed to successfully manage domestic telecommunications infrastructure projects. Exacerbating these practical disadvantages are steady pressures from industrialized nation's for highly technical standards geared toward interoperability of digital systems, the strong influence of transnational corporations, and the importance of regional and national standard setting bodies in developing countries. The speakers suggest ways in which regional cooperation and initiatives can assist developing nations in participating effectively in the international standards setting process.

2.3.1.3 *Economics and Politics of BISDN Standards in the U.S. and Japan*

Hajime Oniki, Professor, Osaka University, Japan, and **Terry Curtis**, Professor, California State University, Chico, USA

2.3.1.4 *The Potential Impact of Europe 1993 Satellite Policy on Economic Integration in the Pacific Area*

Raymond J. Krommenacker, Counsellor, GATT, Switzerland

Proposals for major changes in EC satellite policy center on liberalization of earth segment terminals, free access to satellite capacity, commercial freedom for space segment providers, and harmonization to facilitate provision of Europe-wide services. All of these will have an impact on Pacific communications. As the speaker explains, however, liberalization of space segment access and specialized satellite services, mutual recognition of licenses, technical standardization, and frequency coordination are of special concern to many parties. These concerns may impede speedy implementation of proposed changes. Other obstacles have been policy coordination to match regimes of INTELSAT and INMARSAT and commercial disadvantage vis-a-vis US and Japanese competitors.

2.3.1.5 *Causality Between the Telecommunications Sector and the National Economy*

Hansuk Kim, Researcher/Director of Management Analysis Lab, Korea Telecom Research Center, Republic of Korea

Causal links between telecommunications investments and development of national economies are widely assumed but difficult to substantiate. Through close analysis of various macroeconomic and telecommunications measures, the speaker suggests indicative factors that can be used to guide efficient investment decision making by national telecommunications industries. Included are examples from Korea and other countries.

2.3.1.6 *The Changing Economic Role of Telecommunications*

John Ure, Research Associate, Centre of Asian Studies, University of Hong Kong, Hong Kong

Radical telecommunications technologies introduced during the 1980s did more than change telecommunications infrastructure and utility; they changed the relationship between telecommunications and national economies. The speaker traces the changing relationship between telecommunications and national economies to suggest ways in which the relationship affects both national and regional development priorities. But, the speaker posits, uneven developments between nations mean that telecommunications policies should converge in the foreseeable future.

2.3.2 *Intelligence in the Network*

Chair: **Raynald Leconte**, Representative in South-East Asia, France Telecom International, Indonesia

2.3.2.1 *Toward an Intelligent Wireless Network*

Donald R. Woodwell, Senior Program Manager, IBM Corporation, USA

IBM's perspective on the evolution of wireless networks envisions dramatic shifts from the current emphasis on connections to services and global accessibility. The speaker sets forth an overview of the wireless communications environment, compares essential components of wireless and wireline networks, views the challenges presented by management of wireless operations and pressures occasioned by demand for new services, and suggests means to create and manage new services.

2.3.2.2 *New Customer Services Within the Intelligent Network*

Harry J. Pettit, Vice President and Managing Director, Asia/Pacific Group, and **Barry Sasscer**, Associate Director, Asia/Pacific Business Developments, Bell Atlantic International, Inc., USA

In response to customer demand, network operators are implementing intelligent network architectures that introduce data processing capabilities into the telephone network. The speaker describes examples of intelligent networks being introduced in the Asia/Pacific region. He also focuses on Bell Atlantic's new intelligent network database that provides a software platform supporting a service creation environment.

2.3.2.3 *Development of Intelligent Network and Deployment of Advanced Services*

Hiroshi Shimizu, General Manager, **Masahide Oka**, Senior Manager, and **Ryoji Takaichi**, Manager, NTT Network Systems Development Center, Nippon Telegraph and Telephone Corporation, Japan

The speakers detail NTT's intelligent network structure, original base technology, and functional arrangements. Highlighted are implementation of non-stop service control points, centralized intensive service management systems, and high-density traffic handling capabilities. The presentation concludes with thoughts on the company's plans for future advanced services and the technical requirements for their provision.

2.3.2.4 *A Personal Secretary for Everyone*

Henry Hoeksma, Manager, Research and Development, **Hugh S. Bradlow**, Director, Technology Centre, **John Myers**, Manager, Applications Systems, and **Kaymar Emami**, Manager, Research and Development, NorTel Technology Centre, Wollongong University, Australia

Telephony service advancements increasingly augment the quantum leaps in business productivity afforded by the introduction of personal computers. This presentation focuses on exploratory software systems incorporating call identification services and the ways in which they can increase worker productivity.

2.3.2.5 *NYNEX's Customer Access Network*

Emmett E. McDonough, Director-Strategic Technology Planning, NYNEX Science and Technology, USA

NYNEX's Fiber in the Loop (FITL) program incorporates strategies to deploy the company's Intelligent Broadband Communications Network to business and residential customers. Results and lessons learned in recent NYNEX trials highlight the role in the carrier's strategy of SONET terminals, passive optical networks (PONs), wireless technologies, and experienced gained from NYNEX's UK CATV operations.

2.3.2.6 *The Deployment of Fiber Optic Systems and the Technology*

Takanori Umaryahara, Executive Engineer, **Tetsuya Funabashi**, Senior Engineer, **Kimihide Jinno**, Senior Engineer, and **Kenji Misu**, Engineer, Fiber Optics Local Network Systems Project Group, NTT Network Systems Development Center, Nippon Telegraph and Telephone Corporation, Japan

Introduction of fiber optic systems to existing subscriber networks serves two goals: anticipation of future market demands centered around BISDN and rehabilitation of older metallic networks. NTT's initiatives and plans for deployment of fiber to both residential and business users as part of its goal for the 21st century form the central themes of this presentation.

2.3.3 ***Satellite Systems and Technology Developments in the Pacific***

Chair: **Frank Bowen**, Director, International & Special Programs, GTE Spacenet Corporation, USA

2.3.3.1 *Communications Satellites for the Pacific Islands*

Dennis Connors, Director, Office of Telecommunications Applications, and **William Cooperman**, PEACESAT Program Manager, National Telecommunications and Information Administration, USA

The speakers review the various geostationary and low-orbit satellite systems currently serving or proposed for the Pacific basin. They compare standard data for the various systems including satellite footprints, orbital location, operating bands, services supported, circuits, transponder power and configuration, earth terminals, location of earth terminals, projected costs of satellite services, satellite types and manufacturers, timetables for services, and regulatory issues. They also identify which data is missing from various satellite administrations in order to alert Pacific decision makers to potentially significant issues.

2.3.3.2 *"VISTASAT" An All Digital Small Earth Station for Rural Communication Services*

Stuart P. Browne, Product Manager, SSE Technologies Inc., USA

The thin-route capabilities of satellites provide a cost-effective means for development of rural networks. Key to the success of the new satellite-based development is the use of narrowband analog compounded FM single carrier per channel (SCPC). The speaker describes applications of SSE Technologies' VISTASAT Earth Station System and its implementation with INTELSAT, Asia Sat, and PanAmSat.

2.3.3.3 *Comparison of the Columbia/TDRSS International Satellite System to Other International and Regional Systems*

David K. Aylward, President, National Strategies, Inc., USA

2.3.3.4 *A Study on Feasibility of Mobile Satellite Communication Systems*

Kazuyoshi Miyoshi, Manager, **Sunichiro Egami**, and **Makio Tsuchiya**, Communications Systems, Information & Communication Systems Engineering Center, Mitsubishi Electric Corporation, Japan

Application of CODEC technology for mobile satellite communication systems offers rich possibilities for economical systems. The speakers' study on the economic feasibility of such systems for Southeast Asia suggests that mobile voice and data services and transportable/fixed voice and data services appear to be especially promising.

2.3.3.5 *A Full Mesh Digital DAMA System*

Thomas M. Mynett, Director Electronic Systems and Software, and **Jorge B. Vespoli**, Vice-President of Systems Engineering and Group Senior Staff Engineer, Scientific-Atlanta, Inc., USA

Single channel per carrier (SCPC) and demand assigned, multiple access (DAMA) techniques used in thin-route satellite communications are an attractive method of significantly reducing space and ground segment costs in rural applications. Digital signal processing (DSP) and voice compression technology make it cost effective to use digital transmission techniques. Operating DAMA systems effectively requires full mesh connectivity. The speakers examine various architecture alternatives to mesh DAMA SCPC systems by using new computer technologies and comprehensive software to help manage satellite based-telephone networks.

2.3.3.6 *The Impact of Competition in Satellite Launchers and Spaceports on Pacific Telecommunications*

Arthur L. Levine, Professor Public Administration, Baruch College, City University of New York, USA

The speaker describes the range of alternative launch vehicles, launch services, and spaceports vying for a limited number of launches. He assesses the impact of this competition on Pacific telecommunications, especially on remote and rural areas. Also considered is the viability of new and planned commercial spaceports in Australia and Hawaii, which face financing problems and opposition from environmentalists.

2.3.4 *Telecommunications Planning: Models and Special Circumstances*

Chair: **Warren Falconer**, Chief Technical Officer, AT&T-ICS, USA

2.3.4.1 *Petri Nets for Coordinating Studies Across University and National Boundaries in the Pacific*

Walter A. Sedelow, Jr., Professor, Computer Science, and **Sally Yeates Sedelow**, Professor, Computer Science, University of Arkansas/Little Rock, USA

With financial support from The Exxon Educational Research Foundation, the speakers developed a computer-based methodology for representing intellectually substantive interdependence among educational components within and among universities. The methodology utilizes Petri Nets and incorporates a structural analysis to show how teaching and research activities asymmetrically depend on each other. The speakers discuss applications in the Pacific for their education-modeling techniques, including coordination of degree programs via telecommunications resources at different institutions in different countries, use of computer communication networks (CCNs) for research and academic-industry interface programs, and systems analyzing how concepts in one natural language are understood in different national contexts (e.g., uses in Japan of content from US patents).

2.3.4.2 *Corporate Simulation Model of the Developing Countries for Strategic Development - Case of Indonesia*

Mikio Danno, Senior Researcher, InfoCom Research, Inc., Japan

Patterns of telecommunications development in Indonesia indicate variables important to strategic approaches to future investment and decisions of the national telecommunications service provider, PERUMTEL. The speaker reviews an econometric model developed as a planning tool for long term development commitments. The model takes account of such issues and data as economic and population growth, unemployment variables in the structural economy, relative rates of rural and urban development, telephone density and new demand for connection to the network, demand for new services, operating expenses, and availability of capital investment funding, and project completion timelines. Among the strategy arenas addressed are investment, management, and technical development. The model aims to assist planners in charting optimal balance between complementary and competing strategic objectives.

2.3.4.3 *Interlingual Semantic Mapping*

Sally Yeates Sedelow, Professor, Computer Science, and **Walter A. Sedelow, Jr.**, Professor, Computer Science, University of Arkansas/Little Rock, USA

Computer-based information technology can be employed in a variety of ways to lower language barriers in interpersonal communications. The speakers describe the use of whole-language semantic characterization in technology for an Interlingual Communication Support System (ICSS). The system's potential applications include realtime voice-to-voice translation. The speakers' research, highlighted in this presentation, has focused on the semantic spaces within and between Chinese and English and the use of thesaurus equivalents to allow ICSS to aid in word choice when translating or using a second language.

2.3.4.4 *Structured Diagram for Operations Systems Analysis*

Kang Peng, Member of Technical Staff, AT&T Bell Labs, USA

The speaker presents a structured diagram, called an Operations System Analysis Information Diagram (OSAID), that contains information for operations analysis. The diagram isolates operations by name, functions, organizations responsible for the respective operations, support systems used, and output of operations. Applications include increased comprehension of assignments, enhanced productivity in complex operations, and computer simulation to construct operations models.

2.3.4.5 *Concurrent Rainfall Rate, Beacon Attenuation and Sky Temperature in Papua New Guinea*

G.H. Bryant, Professor/Department Head, and **Lason L. Watai**, Lecturer, Dept. of Electrical and Communication Engineering, University of Technology, Papua New Guinea

2.3.4.6 *Introduction to Fire Protection Emergency Information System*

Shuhei Onuki, System Engineer, Fujitsu Limited, Japan

2.3.5 *Information Services Applications*

Chair: **Cesar Castro**, President & CEO, Capitol Wireless, Inc., Philippines

2.3.5.1 *Low Cost Means for Global Data Transfers Help Sophisticated Technical Tasks*

Nihal Kularatna, Principal Research Engineer, Arthur C Clarke Centre for Modern Technologies, Sri Lanka, and **Martin E. Allard**, Managing Director, Mallard Concepts Ltd., United Kingdom

The speakers highlight experiences gained by a research and development team in a developing country and a design team in the UK when they developed a self-contained electronic mail system. The system developed is an X.25-based error-corrected burst-transfer mode unit allowing ordinary dial-up connections to transmit and receive binary as well as ASCII files error-free. The system does not require a dedicated computer at either end. Circuit design used a PC-based CAD system and incorporated a transfer compression algorithm, both of which helped to produce error-free transmission test results over relatively noisy and unreliable telephone lines.

2.3.5.2 *Government Information Services and Telecommunication Technology in the Pacific Islands: Using the Iowa City Information Services Model*

Mark A. Tolstedt, Professor, Division of Communication, University of Wisconsin - Stevens Point, and **Ronnie Bankston**, Professor, Department of Communication Arts, University of Northern Iowa, USA

The speakers speculate on ways that Pacific island governments can combine existing telephone and television technologies to provide information services to local and often widely dispersed populations. They specifically focus on a case study of the Iowa City government's information service that uses cable television and touch tone telephones to provide access to information in any of more than 30 categories.

2.3.5.3 *VSAT Networks and Commercial Banking: Strategic Business Partners for the 90's*

Donna Birks, Vice President, Western Regions, GTE Spacenet International, GTE Spacenet Corporation, USA

2.3.5.4 *EDI in the Global Marketplace*

Judith A. Fincher, EDI/CALS Marketing Manager, HFSI, USA

The speaker, a key player in the development of an open-EDI conceptual model under review by the International Standards Organization (IBO), describes forces directing electronic data interchange (EDI). She translates requirements of the IBO model into specifications for products and services suitable for enterprises competing in a global marketplace. Currently growing at an annual rate of 60 percent, the value of EDI products and services is expected to exceed US$600 million by 1994. The growth is spurred by the emergence of message and syntax standards and by growth of telecommunications networks. The speaker relates how open-EDI standards development will assist in development of a special EDI mail protocol and related directory services that can provide the threshold platform for explosive growth in EDI worldwide.

2.3.5.5 *The Trend of Voice Message Services in Advanced Information Society*

Kaoru Kazama, System Engineer, and **Kunitoshi Sugi**, System Engineering Manager, NEC Corporation, Japan

Increasingly diversified needs of telecommunications users have produced remarkable increases in supplementary services, including voice messaged systems featuring voice mail, interactive voice response, and speech synthesis. The speakers compare the various types of voice processing equipment to the types of user needs. They examine trends in the voice messaging service market. They look at applications of voice messaging in Japan and the increasing importance of reintroducing "humanization recovery tools" into existing and future services.

2.3.5.6 *Remote Telemetry Applications in Micronesia*

James McConnell, Assistant Professor-Horticulture, College of Agriculture & Life Sciences, and **Bruce Best**, Research Associate-Distance Education Technician, Center for Continuing Education and Outreach Programs, University of Guam, USA

Use of specialized packet modem data transfer packages to relay remotely logged field data to a central hub in the Micronesian Islands is being explored by the University of Guam's College of Agriculture & Life Sciences. The speakers detail elements of the system including sensors used to collect data in the field, modifications for use with Macintosh computers, and software for automatic local loop of simplex VHF or HF radio satellite uplinks. They relate benefits of the system and problems encountered with use of the remote electronic mailbox network that they are developing.

2.3.6 ***Assessing the Role of Telecommunication in Distance Learning***

Chair: **Graham Wagner**, Chief Research Officer, New Zealand Council for Education Research, New Zealand

2.3.6.1 *A Primer on Telecommunications Strategies for the Delivery of Distance Learning*

F. Barry Brown, Professor, College of Education, University of Saskatchewan, Canada

Distance education has come a long way since the inception of correspondence courses circa 1889. Today, interactive satellite delivery allows global delivery of programs. The speaker reviews different strategies for distance education including audio, computer, and video teleconferencing; broadcast television; interactive satellite and video disc; fiber optic; facsimile; ISDN; and multimedia formats. He also compares the cost effectiveness of telecommunication-based delivery with traditional delivery strategies in order to help participants identify the strategies best suited to their own instructional and financial constraints.

2.3.6.2 *The Global Classroom: A Telecommunications Event for Educators*

Patricia L. Taylor, Associate Professor and Chairman, Medical Technology Division, John A. Burns School of Medicine, **John H. Southworth**, Educational Associate, Curriculum Research and Development Group, College of Education, **Hae K. Okimoto**, Manager of Distance Education, Office of Information Technology, **Lori Mukaida**, Coordinator/Manager, PEACESAT, **Ruth A. Streveler**, Projects Coordinator, Center for Teaching Excellence, University of Hawaii at Manoa, **Carl Johnson**, Professor of Geology, University of Hawaii at Hilo, **Jim Bannan**, Acting Director, Telecommunications Systems, Branch, Office of Information and Telecommunications Services, State of Hawaii, **Gerald A. Knezek**, Director, Telecommunications & Informatics Lab, Texas Center for Educational Technology, **Daniel L. Moore**, Director of Technology Telecommunications Specialist for TENET, University of North Texas, USA, and **Chalapan Kaluwin**, Climate Change Officer, South Pacific Regional Environment Programme, New Caledonia

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2.3.6.3 *Evolving Educational Environments: A Projected Impact of the Recent Digital Revolution*

Syed A. Ahamed, Professor, Computer Science, City University of New York, and **Victor B. Lawrence**, Head, Data Communications Research, AT&T Bell Laboratories, USA

Modern communication systems exert unique influences on society, particularly because their applications are being widely incorporated into educational systems. The speakers evaluate the impact of interactive and electronic information retrieval networks both on learning by students and on collective research. By a process of synthesis to integrate the incipient effects identified they then undertake to predict products and technologies that will be most significant for various sectors of the educational environment.

2.3.6.4 *The Role of Knowledge Translators in Telecourses: A Case Study*

Angelina T. Wong, Professor, Extension Division, The University of Saskatchewan, Canada

While a variety of available media can be used to adequately perform most teaching functions, greater variance on learning measures within rather than between media indicates that how a medium is used is more important than which medium is used. By focusing on the distinction between knowledge acquisition and knowledge use, five pilot projects being developed by the University of Saskatchewan experiment with the role of knowledge translators in distance education programs using television. The speaker reports on the benefits and experiences gained through development of these telecommunications-based distance education programs.

2.3.6.5 *The Strategic and Regulatory Role of Evaluation in the Appreciation of Educational Technologies*

John-Claude Marot, Head of Department, Social Management of Technical Innovation, IDATE, France

European experiments in distance education generally have not produced unqualified success. In order to identify factors in distance education that inhibit success and full realization of cost-benefits, European educational institutions have implemented evaluation procedures. The speaker focuses on how these evaluation procedures differ in methodology from more traditional education evaluation techniques. He points out how evaluation provides national education planners with criteria needed to rethink relationships between traditional systems of education and multimedia training.

2.3.7 ***Video in the Pacific***

Chair: Michael Berg, Partner, Miller & Holbrooke, USA

2.3.7.1 *(title tba)*

Stephen T.H. Ng, Managing Director, The Wharf(Holdings) Limited, Hong Kong

2.3.7.2 *(title tba)*

Brian G. Holton, General Manager, KTSF-TV/San Francisco, USA

2.3.7.4 *(title tba)*

Andrea Grosvenor, Acting Director, Regulatory Policy, Telecommunications Policy Division, Department of Transport and Communications, Australia

2.3.7.5 *(title tba)*

Moriya Koyama, Executive Vice President, NHK Japan Broadcasting Corporation, Japan

3.2.1 ***Issues in Telecommunications Technology Transfer***

Chair: **Stephen A. McGaw**, Associate Director-International, Southwestern Bell Corporation, USA

3.2.1.1 *Telecommunications in Developing Countries-Benefiting from New Technologies*

M.V. Pitke, Professor, Tata Institute of Fundamental Research, India

Although recent advances in solid state electronics, digital signal processing, and software development have significantly reduced the costs of switching and transmission techniques, these cost reductions have not lowered the average investment required to provide a new telephone line. Recent research suggests that changes in traditional approaches to implementation of telecommunication plans may help realize such savings. The presentation focuses on new technologies and the most cost-effective strategies for their deployment in network expansions by developing nations such as India, China, Brazil, Indonesia, Chile, Peru, and Mexico.

3.2.1.2 *A Contingency Model for the Network-Based Strategic Planning*

Arthur Lee Gilbert, Regional Advisor on Technology Transfer & Development, Division of Industry, Human Settlements and Environment, ESCAP, Thailand, and **Ian Buchanan**, Senior Director, SRI International Southeast Asia & South Pacific, Regional Headquarters, Singapore

The speakers articulate concepts of technology and enumerate processes inherent in transfers of telecommunications technology. They focus on how these concepts and processes change relationships between organizational stakeholders. By integrating these concepts into a contingent model derived from various analytic frameworks they offer practical recommendations for definition of private strategies and public policy on planning techniques and transnational technology transfers.

3.2.1.3 *Globalization of Training at NEC*

Hiroshi Shigehara, President, NEC International Training, Ltd., Japan

Corporate technical training provides one of the key components for NEC's global operations. The speaker details the growth and current status of NEC's international training programs. He explains how the programs are based on the company's philosophy that customer training is the best method for transferring technology to countries actively seeking to benefit from integration of computing and communications technologies.

3.2.1.4 *The Harmonizing of Patent and Copyright Laws of Pacific Rim Countries*

Stephen E. Baldwin, Patent Attorney, **Daniel L. Appelman**, Special Counsel, **Heller Ehrman**, White & McAuliffe, and **Henry K. Woodward**, Patent Attorney, Townsend and Townsend, USA

Differences between US and Pacific Rim countries' patent and copyright laws impact on trade and investment throughout the region. The speakers identify key differences in copyright and patent laws of nations in the region and review efforts underway in WIPO and GATT negotiations to harmonize such laws.

3.2.1.5 *Information Technology-Led Development: Can the Lessons be Transferred?*

Arthur Lee Gilbert, Regional Advisor on Technology Transfer & Development, Division of Industry, Human Settlements and Environment, ESCAP, and **Ruchadaport Lertphokanont**, Senior Policy and Plan Analyst, Infrastructure Project Division, National Economic and Social Development Board, Thailand

The speakers contrast the past decade of national efforts to use information technology to support economic and social development in Singapore and Thailand. They recommend an agenda for national planning based on an analysis of technology transfer demand issues and supply initiatives in both countries.

3.2.2 ***Issues in Designing Information Networks***

Chair: **Edmund Durand**, Executive Engineer, Telecoms Division, Forum Secretariat, Fiji

3.2.2.1 *Telecommunications Infrastructure and Architecture Issues for Local Governments*

Mack Schwing, Principal, **Jonathan Dharmapalan**, Management Consultant, and **Padriac Riley**, Deloitte & Touche, USA

With limited budgets and a growing need for information exchange, local governments seek to effectively manage their telecommunications systems, assets, and resources. Important issues concern the ways in which applications drive basic needs for telecommunications, legal and regulatory factors that impact on the use of telecommunications, and how evolving technologies and standards can best be applied by government entities. The search for solutions necessarily requires recognition of local government constituencies and responsibilities to effectively leverage public resources, foster economic growth, and meet governmental objectives. The speakers examine these issues and concerns through case studies of telecommunications in three city governments: Honolulu, San Francisco, and San Mateo.

3.2.2.2 *Information Technology As an Emerging Parameter in Regional Planning*

George Darby, Attorney, Law Offices of George E. Darby, USA

The three key factors of real estate development are rapidly changing from "location location location" to "location location and information utilities." The speaker reviews linkages between urban planning and metropolitan area networks, teleports, telework, and information services; examines Japanese plans to decentralize Tokyo; and suggests a theoretical framework in which information technology is a parameter of urban planning.

3.2.2.3 *A Critique of American Infrastructure Network Projects to Guide Efforts to Support Social Values through Networking*

Thomas I.M. Ho, Director, Information Networking Institute, Carnegie Mellon University, USA, and **Kai Sung**, Professor of Information Management, National Central University, Taiwan, R.O.C.

Public-private partnerships throughout the US have produced a range of comprehensive computing and communications infrastructures. The trend shows that each successive wave of projects introduces new layers of technical features and services. The speakers focus in particular on the social implications of representative projects in the hopes that other nations and state and provincial governments can reduce the financial and political costs inherent in developing their networks.

3.2.2.4 *Interconnecting the Pacific*

George J. Boughton, Professor of History, University of Guam, and **Robert Kelley**, Management Communication Services, USA

The thin-route realities of Pacific Basin telecommunications exacerbates developmental, financial, social, and political problems of the region. The speakers propose a regional network based on satellite and, where available, fiber optic links that would initially offer data access and that could eventually be expanded to offer voice and video capabilities. They identify benefits from and financing alternatives for such a network and resources available for its establishment.

3.2.2.5 *Regional Hubbing Strategies*

Ken Zita, Director, Network Dynamics, USA

3.2.3 ***Country Studies: Policy Changes and Their Effects on Business and Society***

Chair: **Robert Harmon**, Executive Director, Bell Atlantic International, Inc., USA

3.2.3.1 *Telecommunications in Singapore - Regional Initiatives in a Global Market Implications*

Diana Mary Sharpe, Consultant, Sly and Weigall International Lawyers, Singapore

3.2.3.2 *China and Hong Kong in 1997: Business Opportunities and Policies*

Lin Sun, Director of Research, Aspen Group, USA

Any new telecom policy in Hong Kong will likely have a double-edged effect. A continuation of laissez-faire policies may irritate Beijing thereby subjecting Hong Kong's telecom administration and technology growth to setbacks. Close control, however, will stymie Hong Kong's established market and economic prosperity. The speaker predicts that the mainland government will pursue a middle path, thereby granting autonomy and favorable terms while imposing strict control in strategic technology planning and procurement of satellite, fiber optics, and new services. He discusses business opportunities and industry issues including mutual investment policies, technical standards, service expansion, and tariffs, all of which will affect growth and the ability to leverage investment in mainland telecommunications infrastructure.

3.2.3.3 *Two Communications for Global Harmony and Linkage*

Masao Yukawa, General Manager, Information Systems & Services Group, Planning & Coordination Dept., Mitsubishi Corporation, Japan

Because deregulation of Japan's telecommunications market occurred within a short time span, Japanese telecommunications companies are still struggling to overcome a number of regulatory issues concerning monopoly status and information disclosure requirements. They are struggling with these issues while the global shift from economies of scale to economies of coverage based on cost-effective networks continues apace. The speaker details issues facing the Japanese industry and identifies factors important to accurate predictions for the future.

3.2.3.4 *The Productive Context in South Korea: An Historical Analysis*

Deanna Campbell Robinson, Telecom and Film, University of Oregon, USA, **Woo-hyun Won**, Department of Mass Communication, Korea University, Republic of Korea, and **Yoon Sun-hee**, University of Oregon, USA

Liberalization of Korea's telecommunications industry during the past two years--including privatization of the monopoly network, pilot projects involving private ownership of cable television, and the introduction of competition in basic services and broadcasting--belie two socio-political issues. The first is that competition in broadcast television potentially diminishes the audience for sympathetic portrayals of dissident activities. The second is that introduction of multiple delivery systems dilutes ability to build a broadband ISDN network. The speakers examine these and other current issues accompanying reforms in Korea.

3.2.3.5 *Getting to Grips with Privatisation of Telecommunications in Malaysia*

Syed Hussein Mohammed, Executive Director, **Shanmugam Manickam**, General Manager, and **Rema Devi**, Assistant Manager, Telekom Malaysia Berhad, Malaysia

Privatization of telecommunications in Malaysia represents a fundamental departure from privatization initiatives in more fully developed countries and began with the adoption of key government policies in 1983. The speakers explain the nation's ambitious regulatory reforms. They compare the salient features of Malaysia's telecommunications policy considerations with those accompanying reforms in nations where telecommunication markets were already mature prior to deregulation.

3.2.3.6 *Developing a Satellite Communication Policy for the Philippines*

Aurora A. Rubio, Supervising Communications Development Officer, Philippine Department of Transportation and Communications, Philippines, **Timothy J. Logue**, Space & Telecommunications Analyst, Reid & Priest, USA, and **Stuart MacPherson**, Director, Policy & Regulatory Matters, Teleconsult Ltd., Canada

The speakers focus on business and policy developments in the Philippines' domestic satellite industry. They profile the two main players in the arena, compare the Philippines' semi-competitive industry with regimes in other nations, trace the impact of this on current and future developments, and provide details on the dynamics informing new policy review mechanisms.

3.2.4 *Regional Approaches to Satellite Systems for the Pacific*

Chair: ***Meheroo Jussawalla,*** *Research Associate/Economist, Institute of Culture and Communication, East-West Center, USA*

3.2.4.1 *Lessons Drawn from 2 Existing Regional Satellite Networks: ARABSAT and EUTELSAT. Application to the Pacific Basin Projects*

Jean-Jacques Bloch, Marketing Manager, AEROSPATIALE, France

Comparing the current uses of two regional satellite systems with their respective initial plans, the speaker draws lessons from both technical and marketing perspectives that can be used to advantage for emerging regional space communications systems in the Pacific. The systems analyzed are ARABSAT, which uses the C-band to serve more than 20 Arab League countries, and EUTELSAT, which uses the Ku-band to serve 28 European nations.

3.2.4.2 *Satellite Solutions for the Pacific Region*

John Stuart, Marketing Director, Communications Satellite Division, British Aerospace Space Systems Limited, UK

Contending satellite service options for the Pacific region include INTELSAT, PALAPA, and ASIASAT. Augmenting these regional capabilities are other systems devoted, as of yet, primarily to domestic service; these include JCSat, AUSSAT, TONGASAT, PACSTAR, and others. The speaker contrasts the performance and tariffs for existing systems with results of a new marketing study for the Pacific region conducted by British Aerospace.

3.2.4.3 *Private Satellite Networks for Asia Pacific International Business Communications*

Daniel B. Freyer, Manager, Financial Analysis, Asia Pacific Space & Communications, Ltd., USA

Corporate and public institutions in the Asia Pacific region, with its less developed telecommunications infrastructure, may have even more to gain from VSAT solutions than their counterparts in the US, where VSAT technology has already provea to be an effective customer-premises private networking solution for data, video, and voice applications. The speaker addresses the conditions for VSAT market development in the US and limitations of current technical solutions for applications in the Asia Pacific region. He reviews the market potential for VSAT networks in the region based on current needs and anticipated developments including increased satellite transponder capacity, industry growth, and regulatory reform.

3.2.4.4 *New Satellites for Asia*

Andrew Jordan, Marketing Manager, Asia Satellite Telecommunications Co., Ltd., Hong Kong

The speaker examines how developments in rural areas and demand for telecommunications services throughout the Asia Pacific region serve as a catalyst for global integration of existing technologies. Among the factors discussed are enhanced connectivity resulting from satellite coverage reaching beyond national boundaries, opportunities to lower end-user costs through satellite technology that bypasses local landline requirements, and increased choice for end-to-end services and broadcast options.

3.2.4.5 *The TONGASAT Asia-Pacific Regional Satellite Communications Network*

Mats C. Nilson, Managing Director, Friendly Islands Satellite Comms., Ltd., and **Sione Kite**, Deputy Chief Secretary and Deputy Secretary to the Cabinet, Prime Minister's Office Tonga

The speaker outlines advantages offered by the TONGASAT Asia Pacific satellite system and illustrates how countries within the coverage area can participate without making financial contributions.

3.2.4.6 *Competition Among Satellite Systems and the Creation of New Communications Markets*

Douglas D. Goldschmidt, Vice President for Market Development and Regulatory Affairs, Alpha Lyracom Space Communications, USA

The advent of significantly increased satellite capacity in the Asia Pacific region heralds competitive pricing of and access to satellite services. Drawing on Alpha Lyracom's experience with the creation of new communications markets in Latin America through the introduction of the PAS-1 satellite, now fully booked with domestic and international video and digital services, the speaker assesses the likely effects of competition on existing communications markets and regulatory policies.

3.2.5 *Telecommunication Technologies Service Education*

Chair: **Eddie C.Y. Kuo**, Head, Department of Mass Communication, National University of Singapore, Singapore

3.2.5.1 *An ISDN Multimedia Distance Learning Trial: Phase One Results Report*

Terry Curtis, Professor, California State University, Chico, **Janet Davidson**, Pacific Bell, **Joyce Inkrott** and **John Perley**, AT&T Network Systems, USA

The speakers present results of a research project involving trials of distance learning technology conducted jointly by AT&T Network Systems, Pacific Bell, and the Center for Instructional Technology Research at California State University, Chico. The trial involved two basic rate interface lines as the transmission medium to support interactive multimedia instructional communication. The results helped pilot project participants to determine minimum transmission capacities required for ISDN multimedia distance learning programs.

3.2.5.2 *Distance Learning System Using ISDN*

Gengo Tazaki, Fujitsu International Engineering Ltd., Japan, and **Yeow-Chin Yong**, Ngee Ann Polytechnic, Singapore

The speakers report on a computer-based training (CBT) field trial that used the ISDN public network in Singapore. They detail the CBT courseware produced by Fujitsu for use with a low-cost ISDN-PC board developed by Singapore Telecom and National Computer Board, analyze the effectiveness of the integrated package for human resource development, and discuss its potential to enhance international cooperation among researchers, schools, enterprise divisions, and companies specializing in development of training materials.

3.2.5.3 *An Electronic Mail Network Linking Libraries in Remote Micronesian Islands*

Arlene Cohen, Systems Librarian, Learning Resources, **Bruce Best**, Technical Assistant, Telecommunication and Distance Education Operation, and **Benit Camacho-Dungca**, Coordinator/Manager, Telecommunication & Distance Education Operation, University of Guam, USA

The speakers describe the derived benefits and problems encountered in an experiment to enhance the electronic communication capabilities that are needed to facilitate establishment of a regional library resource network among libraries and archives on remote islands of Micronesia. An experimental trial of the system involved a specialized modem/electronic mail package originally designed for remote computer networking in Africa and other digitally deprived developing areas. It used local loop uplinks to GOES PEACESAT. Future use will include simplex VHF and HF radio linkages.

3.2.5.4 *Distance Research: Library Research without Going to the Library*

Ralf Neufang, Librarian, Coordinator for CD-ROM and Online Database Searching, University of Hawaii-Manoa, USA

The speaker discusses telecommunications technology required to execute library research and obtain library materials without ever having to step into a library. He describes CD-ROM and out-of-state library database

programs accessed by the University of Hawaii to illustrate potential applications and emerging capabilities for distance research.

3.2.5.5 *Development of Integrated Multimedia Telecommunication Utilization for Project Management: The International Network for Education in Science and Technology (NEST)*

John H. Southworth, Educational Associate, Curriculum Research and Development Group (CRDG), **Mary Gullickson-Morfitt**, Science Educator and Curriculum Developer, CRDG, School of Education, University of Hawaii, **David L. Moore**, Director of Technology, Sanger Independent School District, USA, **Junichi Nozato**, Computer Education Specialist, Sohseikan Intermediate and High School, Japan, **Alexander Uvarov**, Director, Moscow School Telecommunications Network, USSR, and **Donald Young**, Co-Director, FAST Program, CRDG, College of Education, University of Hawaii, USA

The speakers describe developments of the international Network for Education in Science and Technologies (NEST) that links schools in Maine, New Jersey, North Carolina, Minnesota, Texas, Hawaii, Japan, Singapore, Russia, and Hungary. They focus on student use of the network in a pilot program coordinated by the University of Hawaii to collect environmental data including weather patterns, ozone depletion, acid rain patterns, and soil analyses. In addition, they describe current efforts to extend integrated multimedia telecommunications resources and techniques in order to provide synchronous audio/video linkages to remote NEST participants.

3.2.6 ***Organizing and Managing Telecom Enterprises in a Volatile Environment***

Chair: ***Leland W. Schmidt****, Vice President-Industry Affairs, GTE Telephone Operations, USA*

3.2.6.1 *Basic Telecommunication Needs Model: A Methodology for Assessing Information and Communication Poverty*

Mark Balnaves, Lecturer in Social Theory, **Peter Caputi**, Lecturer in Psychology, Department of Social Science, Faculty of Applied Social Sciences and Communications, and **Kirsty Williamson**, Lecturer in Information Science, Royal Melbourne Institute of Technology, Australia

Based on the premise that understanding the information and communications needs of telecommunications users is fundamental to sound policy planning, the Royal Melbourne Institute of Technology, with funding from Telecom Australia, conducted a study aimed at developing conceptual tools for predictive analysis of situations where telecommunications may prove advantageous. Results of the study expressed in a basic telecommunications needs model were field-tested. The speakers elaborate on definitional assumptions clarified through the study of rural and elderly urban users and results of the trials using the methodology developed.

3.2.6.2 *Organizational Restructuring: Fitting a Strategic Framework*

Harvey Leong, Executive Vice President, Business Development, NYNEX Worldwide Services Group, NYNEX Corporation, USA

Arguing that the challenge of integrating a telecommunications company's regional home base with its worldwide operations can be met through a strategic framework, the speaker details the elements and factors driving NYNEX's strategic framework as a model for other companies. Shared mission, values, priorities, business focus, financial objectives, and appropriate organizational structure are elements of particular concern in developing successful strategies. Customer needs, regulatory requirements, and corporate culture necessarily inform the organizational structure for such strategic frameworks.

3.2.6.3 *The COMSAT Model for Signatory Representation*

Maury J. Mechanick, Vice President, INTELSAT Policy & Representation, COMSAT World Systems, USA

Trends toward privatization and deregulation focus attention on models of signatory representation in international satellite organizations such as INTELSAT, INMARSAT, and EUTELSAT. The speaker outlines essential elements and advantages of privatized signatory representation based on the US COMSAT model. He shows how privatized signatory representation enables the signatory company to respond efficiently to a competitive market for satellite-based international end-user services while maximizing collectively defined US interests in the international satellite organizations in which the nation participates.

3.2.6.4 *Maintaining Subscriber Loyalty during Deregulation*

Deborah G. Arnold, International Product Manager, GTE Hawaiian Tel, USA

Deregulation, liberalization of services, privatization, and competitive threats highlight the importance of preemptively preparing a telecommunication provider's subscriber base for environmental changes. Such advance measures, the speaker explains, may enable the carrier to maintain and expand the company's subscriber base and to minimize the impact of change on revenues and profits. The speaker addresses the public relations and marketing techniques employed by GTE Hawaiian Tel and Micronesian Tel when faced with regulation-based changes in their local markets.

3.2.6.5 *Empirical Measurement of Strategic Telecommunications Linkages with Customers, Suppliers, and Business Partners*

Edward M. Roche, Computing and Decision Sciences Department, W. Paul Stillman School of Business, Seton Hall University, USA

Recent surveys of US and European corporations to measure interorganizational linkages between firms and their suppliers, customers, and business partners measured the use of such telecommunications linkages. It also identified challenges in managing such interorganizational linkages. Of particular interest is the fact that 90 percent of such international linkages are used for communication between customers and purchasing and manufacturing functions of the firms surveyed. The speaker outlines results and analysis of the surveys and implications for telecommunications managers.

3.2.6.6 *New INTELSAT Earth Station Type Approval Procedures = Lower Costs + Simpler Implementation*

Calvin Harriott, Manager, Technical Assistance, COMSAT World Systems, USA

INTELSAT's type approval process is designed to facilitate entry of smaller, more cost-efficient earth stations into the global satellite system while ensuring the integrity of system operations. The speaker describes the process and the ways in which it involves earth station manufacturers, vendors, and operators through a series of design reviews, evaluations of manufacturing and quality control measures, and testing to obviate requirements that users' obtain earth station verification.

3.2.7 ***Media Integration: Technology, Reality & Implementation***

Chair: **Anand Kumar**, CEO, Washington International Teleport, USA

3.2.7.1 *Legal and Regulatory Aspects of Media Integration*

Phillip L. Sector, Partner, Goldberg & Spector, USA

The transition to an all-digital telecommunications operating environment poses important implications for how telecommunications are offered and regulated. The speaker explores these implications by distinguishing today's service-based model of telecommunications regulation from the emerging pipeline model for a digital environment in which all services become binary bits in data streams. He outlines the legal and regulatory approaches best suited to the new dynamism of digital telecommunications and provides a case study of the global satellite marketplace where many legal and regulatory issues connected to digitalization have come into sharp focus.

3.2.7.2 *LOUTCH I - The Establishment and Operation of a Moscow/London Satellite Link*

Chris Pooley, AMIEE, BrightStar Communications, Ltd., UK

The establishment of an Intersputnik satellite link between Moscow and London and its integration into the global satellite network provides the special focus of this presentation on the regulatory, political, and commercial environment of the European satellite business.

3.2.7.3 *(title tba)*

Al Levin, Professional Video Transmission Services, USA

3.2.7.4 *Korea's Experience in Telecommunications*

Yong Son, Professor and Dean, **Sang-Chul Lee**, Professor of Journalism and Associate Dean, Graduate School of Mass Communication, **De-Ryong Lyi**, and **Young-Ho Ju**, Chung Ang University, Republic of Korea

Rapid development of Korea's telecommunications infrastructure and information industry is occurring through a variety of initiatives including development of domestic satellite capacity by 1995, increased demand for mobile communications, competitive provision of international services, installation of fiber optic cables nationwide, and commercialization of ISDN service by 1994. The speakers discuss prospects presented by Korea's planned satellite system and opportunities to integrate it with existing communications services. They also discuss prospects for videotex services offerings, and technical challenges posed by recent ISDN developments.

3.2.8 ***Telecommunications and Regional Economic Integration***

Chair: **Don Lamberton**, Professor, CIRCIT, Australia

3.2.8.1 *Regional Economic Integration of the Global Village*

Don Lamberton, Deputy Director, Professor, CIRCIT, Australia

The speaker examines the question of whether intelligent electronics are more conducive to regional economic intergration than progress toward a global village in which societies are linked together in a coherent manner.

3.2.8.2 *Telecommunications and Trade for Sustainable Pacific Development*

Neil D. Karunaratne, University of Queensland, Australia

3.2.8.3 *The Canada-US FTA: Telecom and Regional Free Trade*

Hudson N. Janisch, Faculty of Law, University of Toronto, Canada

The speaker examines the Canada-US Free Trade Agreement (FTA) and suggests that it exemplifies the role telecommunications will play in regional economic integration.

4.2.1 ***Changes at the National Level: Restructuring and Liberalization***

Chair: **Walda Roseman**, Director, Office of International Communications, Federal Communications Commission, USA

4.2.1.1 *Liberalization, Government Commitment and Telecommunication Performance: A Study of Telecommunication Sector Restructuring in Developing Countries*

Nikhil Sinha, Assistant Professor, Department of Radio-TV-Film, University of Texas, USA

Many developing countries view liberalization, the movement away from traditional state-owned monopoly structure toward privatization and introduction of competition, as a way of overcoming chronic deficiencies in

telecommunication performance and distribution of service. The speaker has researched 81 developing countries to assess the impact of policy changes on the manufacture and procurement of telecommunication equipment, ownership of telecommunications facilities, and provision of telecommunication services. Based on his studies, the speaker suggests that sector restructuring is most effective after government investments have enabled a country to achieve certain levels of development.

4.2.1.2 *Privatizing the National Telephone Company - Should You Do It?*

Nicholas P. Miller, Attorney, Miller & Holbrooke, USA

The speaker, an experienced consultant to governments and multinational lending institutions involved with restructuring and privatization efforts in Latin America and Eastern Europe, analyzes the question of privatization from a policy standpoint. His observations point to conditions indicating when privatization is the most desirable policy option for governments maintaining state-owned telephone companies.

4.2.1.3 *Competition: A Path to National and Regional Cooperation*

Rein P. Mere, Senior Manager, Strategic Planning and Development, KPMG Peat Marwick, Australia

Competitive changes recently instituted by the Australian government are driving a major restructuring of the nation's telecommunications industry and have opened opportunities for both local and foreign firms to participate in the market. The full implications of competition and the key issues for consumers, industry, government, and the Pacific region are already becoming apparent as bidders jockey to present the government with attractive packages for a second carrier. The speaker reviews KPMG Peat Marwick's annual survey of trends in the Australian manufacturing industry and focuses on lessons for regional and national cooperation evidenced by joint product development initiatives in the newly competitive climate.

4.2.1.4 *Restructuring of the Global Information Industry and the Resulting Demand for New Skills*

Una Mansfield, Visiting Lecturer, and **Richard A. Joseph**, Lecturer, Information Technology & Communication Unit, Faculty of Informatics, University of Wollongong, Australia

The speakers outline a working model to describe industry sectors based on digital electronics, the degree of interdependence among them, and the interaction between them and other sectors. In view of market and technological factors involved in restructuring of worldwide information industry, structural adjustment of the skilled labor force is inevitable. Among the issues involved in human-centered application of technologies, productivity and transferability of skills are key concerns for management interested in "multi-skilling" its workforce.

4.2.1.5 *Spectrum on the Block: The New Zealand Experiment with Market Allocation of Radio Spectrum*

Milton Mueller, Research Associate, International Center for Telecommunications Management, University of Nebraska, USA

The speaker presents research evaluating New Zealand's policy to allocate radio spectrum on a market basis through tenders and private property rights. Three issues highlight results of the speaker's studies: resulting internationalization of the nation's broadcast and telecommunications industries, Australia's subsequent discussion of spectrum marketing proposals, and integration of New Zealand's approach with the more traditional method of centralized allocation on the international level.

4.2.1.6 *New Directions in Asian Telecommunications; The Soviet Equation: Telecommunications and the New Soviet Union Treaty*

Steve Levy and **Deirdre Buell**, Pillsbury, Madison & Sutro, USA

Policy debates underlying continuing developments in the Soviet Union will significantly impact the region's communications. The speakers review proposals to revise and remake the structure of authority in the former USSR. They remark on how the reorganization of authority will potentially effect continued development of networks and national interconnections throughout the Soviet republics.

4.2.2 *Utilization of Information Networks*

Chair: **Inatio Teanako**, Managing Director, Telecom Kiribati Ltd., Republic of Kiribati

4.2.2.1 *Worldwide Business Television Networks*

Kathleen J. Hansell, President, KJH Communications, USA

Use of narrowcasting satellites to deliver video programming to private corporations, government agencies, and non-profit organizations and educational institutions is supported by both video-only and VSAT data/video networks. Although almost all existing networks operate in analog format, the recent introduction of new technology suggests that future networks will operate in compressed digital video format. The speaker assesses the worldwide market for business television networks and services based on historical evolution of such networks and motivations to implement them.

4.2.2.2 *The Evolution of Voice Processing - Integration of Voice and Data as a Strategic Advantage for Pacific Rim Companies Operating in a Global Market*

Jan Waulk, General Manager, Asia Pacific/Latin America, Octel Communications Corp., USA

The speaker details the growth of voice information processing based on integration of voice and data communications. He reviews the impact of this integration on international business relationships and the benefits of current and potential uses for emerging applications.

4.2.2.3 *An Update of Off-The-Beaten-Track Digital Networks; A Case Study from Indonesia*

Christopher Bent Sivertz, Vice President, Engineering, and **Nigel Bailey**, President, Infosat Telecommunications Ltd., Canada

The speakers present a case-study from Indonesia of a Texas-based multinational corporation's digital satellite network. The case study illustrates that redefinition of corporate communications in the Pacific region is due to rates of economic growth that exceed deployment of public networks and to the suitability of satellites as a reliable communications medium for the Pacific.

4.2.2.4 *Compact Disc Quality International Digital Audio Distribution at C- orKu-Band*

Paul A. Stern, Manager, Strategic Plans, and **Kay M. Norton**, Planning Analyst, COMSAT World Systems, USA

Radio codecs that compress audio signals into relatively narrow radio spectrum bandwidths now make transmission of high quality digital radio economically attractive. The speakers explain how such compression is effected with algorithms to remove imperceptible portions of the audio source and how international distribution can be provided through small C- and ku-band antennae at or near existing radio stations. They describe studies underway at COMSAT Laboratories to determine transponder capacity necessary to carry CD-quality digital audio via INTELSAT satellites and offer their thoughts about the future timing and impact of mobile direct audio broadcasting on fixed service digital distribution networks.

4.2.3 *Undersea Fiber Optic Plans and Technology*

*Chair: **Sione Kite**, Deputy Chief Secretary and Deputy Secretary to the Cabinet, Prime Minister's Office, Tonga*

4.2.3.1 *Cable Network in the Pacific and Asia Region and Optical Submarine Cable Technology*

Hitoshi Yamamoto, Manager, and **Yoshihiko Yamazaki**, Deputy Manager, Submarine Cable Systems Department, Kokusai Denshin Denwa Co., Ltd., Japan

The Trans-Pacific Cable No. 3 (TPC-3), which became operational in 1989 and which links Japan, Guam, and Hawaii with HAW-4, is part of a trend to integrate communications throughout the Pacific into global networks. The speakers discuss the technical configuration of cable networks in the Pacific region and their use of new technologies for optical transmission and amplification of signals.

4.2.3.2 *ASEAN Optical Fiber Cable Network (AOFSCN)*

Abu Baker bin Mohammad, Lecturer, and **Abu Sahmah bin Mohd Supaat**, Assistant Lecturer, Universiti Teknologi Malaysia, Malaysia

More than half of the estimated worldwide investment of $US11 billion to be made by 1996 in cable transmission capacity will be directed toward developments in the Asia Pacific region. The speakers describe the detailed plans for an ASEAN Optical Fiber Cable Network (AOFSCN) and its contribution to the global digital network.

4.2.3.3 *AT&T Next Generation Undersea Cable Systems and Technology - Meeting the Needs of the Global Market*

Debra J. Guancione, Product Manager, and **Larry Blendinger**, AT&T Submarine Systems, AT&T International Communication Services, USA

The speakers describe the next generation of repeatered undersea cable systems being planned by AT&T. The systems will offer gigabit capacity compatible with ISDN and the global intelligent network. They also provide information on systems being developed by AT&T to offer compatibility with CCITT interface standards, to meet or exceed CCITT transmission performance requirements, and to support Shared Protection Ring (SPRING) architecture designed for traffic protection using multiple cable routes.

4.2.3.4 *Pacific Scarab One - Deep Water Acquisition, Burial and Retrieval*

Robert T. Bannon, Senior Engineer - International Marine Operations and SCARAB Systems, AT&T Transpacific Communications Inc., USA

AT&T's fifth generation vehicles supporting submarine cable maintenance and repair operations, having recently completed sea trials and acceptance testing, became operational this past fall. Used for inspection surveys, cable acquisition, and maintenance and restoration of international communications in the Pacific and Indian Oceans, the remote operated vehicles resulted from international design efforts involving hardware and software contributions from the US, Canada, Australia, Germany, and France. The speaker describes development, trials, and uses for the new PACIFIC SCARAB 1 (tm).

4.2.3.5 *AT&T Submarine Systems, Inc. Non-Repeatered Product Line Overview*

Barbara Halderman, Product Manager, AT&T Submarine Cable Systems, Inc., AT&T International Communications Services, USA

Non-repeatered undersea systems, those not requiring undersea plant, can provide transmission facilities spanning bodies of water less than 300 kilometers. The speaker introduces AT&T's enhanced product line of non-repeatered systems designed to span greater distances while maintaining system performance requirements.

4.2.3.6 *The Aloha Cable: A New Self-Restoring, High Capacity Cable with SONET*

Dennis W. Elliott, Transnational Telecom, and **Geoffrey Thornton**, Northern Telecom/STC Submarine Systems, UK

By the end of 1992 digital transmission capacity between Hawaii and the US mainland will be markedly enhanced by the Aloha Cable. The speakers describe the cable, which will feature a self-restoring design to more resiliently

withstand man-made disruption and 2.5 Gbit/s SONET-standard transmission.

4.2.4 *Regulatory Issues and Processes*

Chair: **Ruth O. Sweetman**, Partner, Denton Hall Burgin & Warrens, Hong Kong

4.2.4.1 *The Dynamically Changing Regulatory Climate for Foreign Investment in United States Telecommunications Companies*

Andrew D. Lipman, Partner, Swidler & Berlin, USA

Foreign ownership and investment in operations of a US telecommunications carrier trigger a wide variety of federal statutes, FCC rules, and other restrictions that may depend on the nationality of the purchaser. By reviewing federal laws, regulations, regulatory agency doctrine in applying the laws, various legislative initiatives, and state regulations governing foreign ownership interests in US communications companies, the speaker identifies legal and policy issues raised by such acquisitions.

4.2.4.2 *Regulation of Wireless Communications - The Need for Reform - An Australian Perspective*

John Griffiths, Partner, and **Ian Cunliffe**, Partner, Blake Dawson Waldron, Australia

Analysis of reforms in Australia's and other nation's telecommunications laws has paid relatively little attention to wireless communications, despite the convergence of telecommunications and radio communications technology. The speaker assesses Australia's existing procedures for managing and allocating frequency spectrum and advocates reform of frequency allocation procedures in anticipation of WARC '92.

4.2.4.3 *Telecommunications Regulation and Public Choice*

James A. Montanye, President, Cornell Consulting Group, Inc., USA

The speaker presents the view that policy shifts regarding the structure of telecommunications regulation are motivated more by bureaucratic rent seeking than by governmental interest in increased economic efficiency. After critically examining current economic theories of telecommunications reform, he illustrates his hypothesis with examples of legislative choices thereby providing a different perspective within which to understand the status and direction of telecommunications regulation.

4.2.4.4 *Regulatory Issues in the Communication Policy of Hong Kong: Setting News Rules of Game for Broadcasting and Telecommunication*

Paul Siu-nam Lee, Lecturer, Department of Journalism & Communication, Chinese University of Hong Kong, Hong Kong

Given rapid technological developments and the increasing influence of China in Hong Kong's affairs, the conventional wisdom of "positive non-intervention" in Hong Kong's communication policy and planning no longer applies. The speaker reviews some of the major issues facing Hong Kong's policymakers including cross-media ownership, deregulation of the common carrier, competition between and complementariness of various technologies, "must-carry" rules for cable TV, regulation of satellite TV, bans on political broadcast advertising, and controls on information services. Citing the demise of Hong Kong Cable Communications as a watershed event in policymaking, the speaker outlines the need for new rules in Hong Kong's telecommunications regulation environment.

4.2.4.5 *Effective Regulatory Procedures: The Foundation of Successful Telecommunications Reform*

Aileen A. Pisciotta, International Communications Counsel, Latham & Watkins, USA

Fundamental elements of sound telecommunications regulatory procedures include transparency, consistency, and flexibility. Account must also be taken of hierarchies of legal instruments and legal functions in drafting new telecommunications laws, establishing regulatory policies for newly privatized or liberalized markets, and

identifying the discretionary powers of regulatory agencies. The speaker focuses on recent examples of proposed privatization in Argentina, Mexico, Venezuela, and Australia. She offers recommendations toward ensuring that regulatory procedures and mechanisms are properly implemented during the privatization and liberalization processes.

4.2.4.6 *Devising a Winning Strategy for Deregulation*

Paul Jansen, Principal, and **Michael Rennie**, Senior Manager, McKinsey & Company, Australia

The speakers present and discuss three elements of an existing carrier's successful transition during deregulatory reforms or privatization: development of a deregulation strategy not simply reactive to external initiatives, identification of competitive responses, and reorientation to become customer and cost focused in advance of change. These organizational responses, they posit, allow telcos to preserve the loyalty of key customer groups and quickly develop new skills, particularly in marketing, general management, and customer-based systems.

4.2.5 ***Dispersed Socio/Economic Activities via Information Technology: AKA Telework, Telelearning, etc.***

Chair: **Rick Withers**, Network Design and Information Services, Education Technology Centre of B.C., Canada

4.2.5.1 *Telework Troubles, Traumas, and Triumphs: Confessions from Telework Planners Around the Pacific Rim*

Gil E. Gordon, President, Gil Gordon Associates, USA, **Wendy Spinks**, Senior Research Associate, and **Norihiro Katada**, Senior Research Associate, Institute for Economic and Financial Research, Japan

Drawing on the experiences of telework planners and implementors in the US, Japan, Australia, and New Zealand, the speakers address issues surrounding telework to balance the commonly observed over-enthusiasm expressed by telework proponents. They look at employer resistance, factors determining employee adaptability to telework, technological obstacles, the impact of home and family life on telework productivity, social and cultural concerns that might explain government reluctance to promote telework, and factors in the public policy environments that inhibit telework policy initiatives.

4.2.5.2 *A Trail of Teleworking and Telelearning - Practical Approach in Communication Software Field*

Kiyoh Nakamura, General Manager, Software Development Division, **Jiro Tsuboi**, **Hitoshi Ito**, and **Yukio Kiyokane**, Communication Systems Group, Fujitsu, Ltd., Japan

Through eight satellite offices connected to its central office, Fujitsu's Communications Division conducts distributed development of communication software. The speakers look at how telework provides Fujitsu with a response to changing employment structures in the computer industry, which are largely caused by a shortage of software engineers. They address issues confronted by Fujitsu in telework situations. These issues include training to improve and adapt engineers' skills to meet company standards and needs, communication links between satellite offices, and distributed telelearning programs to provide uniform training.

4.2.5.3 *Telecommunications, Information Technology and the New Organization - and You*

John Spence, Managing Director, John A. Spence & Associates, Australia

Economic and competitive pressures of IT necessitate changes in management practices and organizational structure. The speaker examines the flatter organizational structures and more specialized roles of management that result from IT applications and discusses changes due to telecommunications and computers in the workplace.

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4.2.5.4 *Learning in the Imagination Age: The Student as a Network Citizen*

Roger Hart, Senior Consultant, Teleconsult Ltd., **Rick Withers**, Director, Industry Relations and Administration Telecommunications, and **David Porter**, Telecommunications Project Director, Education Technology Centre of British Columbia, Canada

The speakers describe the Southern Interior Telecommunications Project (SITP) designed to provide "network citizenship" to students removed from the major metropolitan centers in British Columbia. The project aims to expand access to digitized voice, video, and "virtual reality" transmissions being offered by leading universities and institutions in metropolitan areas.

4.2.5.5 *Wireless Evolution: New Choices for Asia*

Rafael A. Sanabria, Director, Marketing, International Cellular Networks, Northern Telecom, USA

Deployment of digital communications through ISDN and advanced intelligent networks has brought with it attempts to simplify the number of standards. Meanwhile, several other technologies are being deployed worldwide to provide wireless communications that will serve a variety of needs and demands. Based on constraints imposed by standards selected for wireless communications in Europe, the speaker discusses alternate choices still available to the Asia Pacific that might enhance rather than inhibit evolution of wireless communications deployment throughout the region.

4.2.6 *ISDN Developments*

Chair: **Seiichi Tsugawa**, Manager International Organization Division, International Affairs Department, Kokusai Denshin Denwa Co., Ltd., Japan

4.2.6.1 *ISDN Applications . . .? It Depends . . .?*

Charles T. Cranford, ISDN/Centrex Specialist, Telecommunications Research Associates, USA

Unless vendors and end users step up to some "agreements," ISDN will offer considerably less than it otherwise could, and ISDN applications will be perceived differently by various companies. This has not stopped some companies from installing ISDN in order to reap benefits based on their individual needs. The speaker looks at the requirements for broad acceptance of ISDN technology and identifies which requirements must still be met for marketplace "pull" to take over from the vendor marketing "push" common today.

4.2.6.2 *An Advanced Satellite Communication System for ISDN Subscriber and Trunk Applications*

Katsuhisa Uno, Engineer, **Masahiro Umehira**, Senior Engineer, **Tatsuo Katayama**, Executive Engineer, and **Hiroshi Nakashima**, Executive Engineer, NTT Network Systems Development Center, Nippon Telegraph and Telephone Corporation, Japan

The speakers propose an advanced satellite communication system for ISDN subscriber and trunk applications integrated to terrestrial ISDN networks. The proposal is based on development of such a system by NTT and includes multiple access capabilities, alternative trunk circuits for overflow traffic, customer premise earth stations, and full interconnectivity to the existing public switched telephone network.

4.2.6.3 *An Advanced Network Control System for ISDN Satellite Communication System*

Yoshihiko Shiomi, Senior Engineer, **Kenji Nakashima**, **Hiroshi Nakashima**, Senior Engineer, Supervisor, **Masafumi Onuki**, Senior Engineer, Supervisor, and **Kazuhiro Nagayama**, Senior Engineer, NTT Network Systems Development Center, Nippon Telegraph and Telephone Corporation, Japan

Complementing the presentation in 4.2.6.2, the speakers describe the technical features and functional advantages of the network control system for ISDN subscriber and trunk applications that is part of a satellite communication system being developed by NTT. Included is information about satellite channel control units to handle the different transmission speeds used by satellite ISDN capabilities and routing controls to match

operating standards for the satellite. Routing controls in the system NTT is developing enable the system to select single-hop connections between any two earth stations in the network. Other features include call-oriented demand-assignment satellite channels and satellite interface units converting continuous line signals to and from frame type signals.

4.2.6.4 *ISDN Centrex Applications in a Large Multinational Company*

A. Hastings, J. Heneghan, T. MacGregor, L. Steffes, and **R. Thompson**, Members of Technical Staff, AT&T Bell Laboratories, USA

Numerous factors have limited ISDN deployment including connectivity between telephone companies, terminal portability and compatibility, regulatory support for new technologies, availability, limited CPE suitability to ISDN uses, and the limited number of ISDN applications. The speakers describe the operational ISDN Centrex system used at Bell Labs. The system includes local to global videoconferencing capabilities, ISDN terminal interface cards, host multiplexed interfacing, telephone call control via data terminals, LAN extensions, and ISDN direct to employees' homes. The presentation demonstrates that underutilized potential for ISDN can be tapped under proper conditions.

4.2.6.5 *'I-Board 64' for Personal Computer Communication Over ISDN*

Tomiji Soga, Vice Director, **Kazuhiro Nomoto**, Chief Engineer, and **Taizoh Shutoh**, Staff Engineer, NTT PC Communications Inc. System Development, Nippon Telegraph and Telephone Corporation, Japan

The speakers discuss NTT's I-Board 64 the enable ISDN telephone and digital data communications in channel circuit and packet switched modes over metallic and fiber optic cables. The technology is used in NTT's ISDN services conforming to CCITT I-series recommendations and domestic ISDN protocols recognized by the Telecommunication Technology Committee since 1987.

4.2.7 ***Mobile Communications***

Chair: **Brian Quinn**, Digital Computer Services Ltd., UK

4.2.7.1 *Growth Through Integration*

Edward R. Slack, Director, International Land Mobile Development, COMSAT Mobile Communications, USA

Technological change, regulatory policy shifts, and the development of computers for networking control create an environment in which it is essential that system architectures remain flexible in design. This accommodates efficient means of satisfying customer requirements without necessitating replacement of existing systems and negating advances of earlier innovators. Looking at the situation of mobile communications and the MARISAT/INMARSAT systems developed by COMSAT, the speaker argues that open architectures best enable expansion of system applications and markets while minimizing self-defeating inefficiencies in capital investments.

4.2.7.2 *Advanced Messaging in the Pacific Region*

Alexander H. Good, President, and **T. Sanford Jewett**, Director, Business Development, Mtel Corporation, USA

Just as cellular telecommunications has encountered surprisingly healthy demand as an alternative to wireline telephones, paging has major potential to meet communications needs in lesser developed nations. The speakers discuss the obstacles to global accessibility--including regulatory environments, fiscal risks in business operations, market competition from other technologies, and lack of alphanumeric interface between callers and their paging system. They offer solutions that will provide international paging capabilities to sustain high growth rates in the paging industry.

4.2.7.3 *Personal Communications from a Manufacturer Viewpoint: Today and Tomorrow*

Brain Ponte, Planning Manager, Worldwide Telecommunications, Motorola, Inc.

4.2.7.4 *Global Assessment of PCN Technology and Markets*

Indu B. Singh, President, and **Paul B. Silverman**, CEO, James Martin Strategy, Inc., USA

4.2.7.5 *Towards the New Age of Mobile Communications-NEC's Mobile Communications Platform*

Tomiaki Mizukami, Vice President, Communication Terminal Group, **Minoru Tanaka**, General Manager, Communication Terminal System Division, and **Yugi Kitahara**, NEC Corporation, Japan

Custom networking platforms enable mobile communications network applications to be efficiently deployed on a flexible coverage basis. The speakers present NEC's mobile communication platform that features digital interface technology, effective use of frequency spectrum, mobile communications, and user terminal technology.

4.2.7.6 *Requirements for Local Area Networks*

Mil Ovan, Senior Marketing Manager of Altair Products Operations, Radio-Telephone Systems Group, Motorola, Inc., USA

Wireless In-building Networks (WINs) represent the next major communications frontier for radio applications. The speaker reports on extensive market research to determine demand in this new market segment during the 1990s. Survey results from more than 1000 corporate and government entities focusing particularly on LANs were used. The presentation reports on data obtained about trends in personal computer and LAN growth; problems with cabling associated with business moves, changes and office reconfigurations; cost effectiveness of wireless LANs, and analysis of the requirements for wireless LANs for acceptance by users, environments best suited to their use, and specific product requirements.

4.2.8 ***Future Satellite Developments and Applications***

Chair: **Ambassador Diana Dougan**, Senior Advisor & Chair, International Communications, Center for Strategic & International Studies, USA

4.2.8.1 *21st Century Satellite Options for the Asia-Pacific: A Cooperative U.S.-Japanese Study*

Takashi Iida, Guest Professor, Interdisciplinary Telecommunications Program, and **Joseph N. Pelton**, University of Colorado, USA

A year-long study carried out by Japanese and US scholars at the University of Colorado identified a range of new satellite system options for the Asia Pacific region. The speakers report on the results of the study, which are being presented to NASA, MPT, and NASDA. They identify the potential for lightsats to aid education, health, weather alerts, and rescue operations; a US-Japan prototype satellite to operate at multi-gigabps speeds; new uses for GPS packages on low orbit satellites to monitor global warming; developments in ultimate small aperture terminal (USAT) technology to facilitate services to rural and remote areas; and conceptual studies to create satellite systems for the 21st century that will have high performance features, reliability with minimum transmission delays, and easy interconnection to terrestrial systems.

4.2.8.2 *Pan-Pacific Information Network System Using ETS-V*

Rytaro Suzuki, Senior Research Engineer, Mobile-Satellite Communications Section, Communications Research Laboratory, MPT, **Shinzo Ohkubo**, Student of Master Course, University of Electro-Communications, **Toshiyuki Ide**, Research Engineer, **Makado Sakasai**, Research Engineer, **Kimio Kondo**, Chief of Mobile Satellite Communications Section, Communications Research Laboratory, MPT, Japan, and **Takahi Iida**, Guest Professor, Interdisciplinary Telecommunications Program, University of Colorado, USA

Since 1987, MPT and Tohoku Unversity in Japan have been researching and developing technical aspects needed to integrate a digital satellite-linked pan-Pacific information network system. The speakers present the results of Japan-Hawaii experimental trials using an ETS-V antenna beam available through PEACESAT. They provide information on their use of digital modulation techniques with error correction coding to interconnect satellite transmission and earth station reception with fax, data, and computer network capabilities.

4.2.8.3 *PEACESAT*

Lori Mukaida, Director, PEACESAT

4.2.8.4 *PACSTAR*

Elias

4.2.8.5 *Handheld Satellite Communications - Facts and Fiction*

Durell W. Hillis, Corporate Vice President and General Manager, Satellite Communications, Motorola, Inc., USA

Since the announcement in June 1990 by Motorola of its Iridium (tm) system, a number of potentially competitive systems in various forms have been announced. The speaker examines the competitive systems' capabilities to show that Motorola's system remains unique in its handheld satellite communications capabilities.

4.2.8.6 *The Need for a Universal Response to Disaster Relief*

Louis Bransford and **Bert Cowlan**, Senior Advisor, Public Service Satellite Consortium, USA

Most existing telecommunications systems are vulnerable to natural disaster because of their size, limited durability, lack of portability, relative difficulty of use in disaster situations, dependence on external power supplies, and/or difficulty in being stockpiled where needed most. The speaker outlines how new technologies predicated on disbursed use for personal communications fill a need for disaster communication capabilities.

4.3.1 ***Factors Affecting International Telecommunications Trade***

Chair: N. Mark Lopianowski, Director, Teleconsult Ltd./Teleconseil Ltee., Philippines

4.3.1.1 *The Importance of Open Markets in International Telecommunications Trade*

Allen R. Frischkorn, Jr., President, Telecommunications Industry Association, USA

Restricted access to telecommunications markets in foreign countries creates a number of problems for US manufacturers. The speaker outlines these problems and their significance to the global marketplace. He focuses on market access problems in Japan, Korea, Canada, and the European Community and discusses the multilateral negotiations of the GATT as well as bilateral discussions to resolve market access issues.

4.3.1.2 *Overview to ASEAN Regional Telecommunications Development Interests in a Global Environment*

Mark Hukill, Senior Lecturer, Department of Mass Communication, Ngee Ann Polytechnic, Singapore

Regional issues with global implications affecting Southeast Asia include competition and its limits, regulated versus relatively unregulated provision of systems and services, changing business patterns of telecommunications use to achieve strategic growth, implementation of digital technology, and private investment in systems and services. The speaker presents a broad overview of the regional interests of the ASEAN nations in developing telecommunications and information systems within the context of these issues and the policy revisions being adopted in the area. He identifies the relative importance and influence of Japan, Canada, and the US versus the European Community in development of Southeast Asian telecommunications as evidenced by increasingly keen competition for markets throughout the region. He also looks at growth of local private sector industries, basic infrastructure development initiatives, management reforms at state-owned entities, private participation in investment and revenue sharing, privatization, gateways and tariffing, access and interconnection, and global standardization.

4.3.1.3 *Telecommunications Network Quality and Export Performance*

Kara Boatman, Senior Analyst, National Economic Research Associates, and **Joseph F. Francois**, Division Chief, Research Division, US International Trade Commission, USA

The speakers focus on the important factor of telecommunications network quality in determining a nation's ability to engage in cross-border service transactions. They utilize data on US bilateral service flows and emphasize intermediate services such as management, consulting, information and data processing, engineering, and research and development, which are at the center of the GATT initiative to liberalize trade in services.

4.3.1.4 *Telecommunications Standards and Asia/Pacific Trade*

Eugene B. Lotochinski, Vice President, Marketing and Business Development, Northern Telecom Asia/Pacific, Japan

Standards enable interconnection of telecommunications networks that in turn allows free flow of information fundamental to trade. Standards emerge from a complicated process that attempts to maximize their benefits to telecommunications users, carriers, and equipment suppliers, including the ability to reap a reasonable return on investments to develop new products. The speaker reviews the international and regional standard setting bodies, the interplay between regional and international standard setting activities, and the significance of the fact that the Asia/Pacific region does not have a regional standards setting body.

4.3.1.5 *Relationships between Japan, Europe and the USA*

Yves Gassot, Director, IDATE, France

Europe's trade deficits with Japan and the US result primarily from imports of consumer electronics, information technologies, and semiconductors. The speaker analyzes relationships between Europe's industry and communications services sectors and those in the US and Japan to highlight new policies being adopted or studied by the European Community in the areas of technological research, industrial policy, and bilateral and multilateral relations.

4.3.2 *ISDN Applications and Markets*

Chair: **Sachi Senmoto**, Executive Vice President, DDI, Japan

4.3.2.1 *Bringing Universal ISDN Service to Reality*

Dale T. Rogers, Marketing Manager, Complimentary Services and International Business Development, AT&T Network Systems, **Jerry A. Nowicki**, ESI Systems Interconnections, USA, **Takeshi Kawauchi**, Associate Vice President, Executive Manager, and **Osamu Inoue**, General Manager, NTT ISDN Promotion Department, Nippon Telegraph and Telephone Corporation, Japan

Although ISDN applications have spread throughout the industrialized world, factors such as the high cost of terminals, lack of terminal portability and connectivity between switches, and differing equipment standards have inhibited achievement of earlier projected market penetration. Consequently, many customers have looked to other technologies and service platforms to meet their sophisticated communication needs. This has begun to change, however, with cooperative efforts between equipment and service providers to better serve the needs of multinational customers. The speakers outline such recent cooperative efforts and the need to continue these endeavors in order to assure universal availability of ISDN.

4.3.2.2 *NTT'S ISDN "INS-Net" and Customer Interest in Global ISDN*

Naoki Takeda, Senior Manager, ISDN Development & Promotion Department, Nippon Telegraph and Telephone Corporation, Japan

Since its introduction in 1988, NTT's "INS-Net" ISDN services have expanded rapidly to meet customer demand throughout Japan. Customer demand for global ISDN has now become acute, and NTT has opened ISDN services between Japan and 11 other countries. These applications are, however, still limited mainly to G4 facsimile and videoconferencing capabilities. Future development will continue to be retarded by lack of terminal interconnectivity and differing national standards for ISDN transmissions.

4.3.2.3 *Storage Concepts for Moving Picture Database on B-ISDN*

Junichi Kishigami, Senior Research Engineer, **Norihiko Sakurai**, Senior Research Engineer, and **Hirotaka Nakano**, Senior Research Engineer, NTT Communications and Information Processing Laboratories, Nippon Telegraph and Telephone Corporation, Japan

The speakers propose a parallel transfer storage system with a new architecture to transmit moving picture data via ISDN for on-demand TV applications. They discuss the challenges posed by transmission of motion picture data, including complications affecting multiple access. The system they have been developing would combine magnetic disk-array for short pictures, such as weather forecasts and news, with optical disk MSS for longer pictures.

4.3.2.4 *To Market, To Market: ISDN in Hawaii*

Suzanne M. Neufang, Graduate Student, University of Hawaii, USA

Despite all its talk about economic diversification and efforts to lure high tech industries to Hawaii, neither the state nor GTE Hawaiian Tel has provided an environment conducive to or telecommunications systems technically advanced enough to entice such industries into relocating to Hawaii. A major factor has been Hawaiian Tel's postponement of deployment of ISDN in the local network until 1992. The speaker examines the potential market for ISDN and the factors inhibiting implementation of ISDN in Hawaii, including standardization concerns, inadequate telco planning, rate structure approvals, and the largely negative impact of the Public Utilities Commission on ISDN deployment.

4.3.3 *Country Studies: Restructuring/Privatization*

Chair: **Waleed Hanafi**, Chairman, Hong Kong Telecom Association, Hong Kong

4.3.3.1 *Australia's New Telecommunications Regime - The Opportunities Examined*

Raymond B. Kiley, Senior Associate, Baker & McKenzie, Australia

During 1991, the Australian government introduced substantial reforms to Australia's telecommunications industry. The reforms include introduction of private sector competition to a merged government-owned domestic and international carrier, market liberalization for enhanced services, and resale of network capacity. The speaker provides an overview of the newly reformed telecommunications regime and comments on opportunities for equipment vendors and service providers.

4.3.3.2 *Telecommunications Development in Hong Kong During the Sovereignty Transition from the British to the Communist Chinese in 1997*

Tuen-yu Lau, Assistant Professor, Department of Communication, Purdue University, USA

Regional and global telecommunications integration depends on merging different political and economic interests. The speaker uses Hong Kong as a case study to address issues associated with such processes of mutually beneficial compromise. Hong Kong's situation highlights issues involved in control over franchise matters, policy determinations affecting local and international telecommunications investments, and definition of appropriate and practical strategies for expanded development of national, regional, and global telecommunications capacity. The speaker proposes inter-provincial development initiatives coupled with a competitive structure of regional operating companies, similar to the RBOC structure introduced in the US, as a means to achieve rapid expansion and competitive development of China's domestic telecommunications infrastructure and interconnectivity to the global telecommunications network.

4.3.3.3 *Korea Telecom's Globalization Scheme in Face of Restructuring of World Telecommunications Industry*

Wan-young Yu, Vice President, External Cooperation Planning Group, Korea Telecom, and **Sukbaum Pahng**, Chung Ang University, Republic of Korea

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Globalization for Korea Telecom means not only geographic expansion but, more importantly, improvement of managerial skills and technological innovations adequate to compete with advanced nations. Korea Telecom's rapid expansion of the domestic network - 2.8 million lines out of a total of 15 million lines were added in 1990 alone - belies the fact that more than 95 percent of revenues come from voice services. The speakers describe Korea Telecom's preferred strategy of participating in global markets through simultaneous expansion and diversification of domestic service capabilities while putting its expertise at the disposal of developing nations.

4.3.3.4 *An Exercise in Privatization: The Making of Telekom Malaysia*

Baharuddin Aziz, Senior Lecturer (Telecommunication & Film), School of Communication, MARA Institute of Technology, Malaysia

For the past decade, governments in the ASEAN nations have incorporated strategies for information and communication technologies in their national socio-economic plans. The plans regard telecommunication investment as a prerequisite to export-led growth and include deregulatory initiatives different in form than those pursued in other countries. The speaker reports on the transfer in 1987 to Telekom Malaysia, a publicly held private company, of the assets and operations of the state-owned carrier and its role as a catalyst for rapid development of Malaysia's export-oriented telecommunications industry.

4.3.3.5 *Privatization of Telecommunications Facilities in the Philippines*

R.I. de Vera, Undersecretary, Department of Transportation and Communications, **C.H. McGlone**, Telecom Consultant for the United States Agency for International Development, Philippines, and **R.L. Rothery**, Vice President Operations, Teleconsult Ltd., Canada

Privatization efforts in the Philippines focus on the Rural Telephone Development Program, the National Telephone Program, and Municipal Telephone Project Office. The speakers report on these privatization initiatives in the context of a privately-owned dominant carrier, the government's objectives, and funding decisions to support private companies and transfer facilities to a private sector characterized by numerous smaller operators.

4.3.4 ***Telecommunications and Economic Development***

Chair: **Sapa'u Petaia**, Director, Posts & Telecom Department, Western Samoa

4.3.4.1 *The Telecom Gap: The Impact of Communications Technologies on Developing Economies*

Carlos Hernandez Medina, General Manager, Cincinnati Bell Information Systems Inc. of Mexico, Mexico, and **James F. Hamblin**, Managing Director - Asia/Pacific Region, Cincinnati Bell Information Systems Inc. (International), USA

Wide disparities of development in a nation's rural and urban telecommunications infrastructure can inhibit economic growth. Mexico, like many other Pacific nations, has instituted an aggressive economic development program that includes creation of a sophisticated communications infrastructure extending to rural areas. As part of the nation's program, several cellular service providers turned to Cincinnati Bell Information Systems, Inc. for information management support. The speakers explain how the company built a modern data management facility that is managed and staffed by Mexican nationals, employs a mixture of American and Mexican technologies, and is a critical element facilitating Mexico's burgeoning mobile communications industry.

4.3.4.2 *Electronic Byways: Creating Telecommunications Incentives for Economic Development*

Heather E. Hudson, Director, Telecommunications Management and Policy Program, University of San Francisco, USA

The presentation looks at various approaches by states in the US to incentive regulation, particularly those tieing incentives to upgrading of infrastructure. The speaker also examines other issues such as quality of service standards in rural and less profitable areas and rate setting to address urban-rural disparities. She concludes with observations on the importance in such programs of goal-setting, coordination between telecommunications and economic development agencies, and models of incentive-based regulation supporting economic

development that are relevant to both industrialized and developing countries seeking to deregulate telecommunications.

4.3.4.3 *Telecommunications Hubs: The Role for Telecommunication in Regional Economic Development and Cooperation*

Peng-Hwa Ang, Doctoral Student, Michigan State University, USA

During the past 20 years, the number and diversity of multinational companies has increased tremendously. Multinational companies have become more integrated and more explicitly fiscal in character, facilitating worldwide development and implementation of telecommunications technology. The speaker looks at the phenomena of telecommunications hubs using the analytic tools of economic geography defined by information sectors and location and diffusion theories. Using these theories, the speaker explains factors behind the location of telecommunications hubs and their role in regional economic cooperation and development.

4.3.4.4 *The Impact of Advanced Telecommunications on Business Development and Job Distribution*

Ronald P. Uhlig, Director, International Market Development, Northern Telecom Asia/Pacific, USA, and **Chao Thongma**, Executive Director, Asia-Pacific Telecommunity, Thailand

Because Asia/Pacific countries place major emphasis on job creation, they generally emphasize technology transfer in their development plans. The speakers examine the benefits of Automatic Call Distribution (ACD) centers that are widely used to improve efficiency in handling incoming calls to information intensive businesses. They provide examples of how ACD centers facilitate broader distribution of jobs on a global basis and how they enable self-employment opportunities to be more readily incorporated into the economic profiles of all nations.

4.3.4.5 *Rural Telecommunications Development - The REA Concept*

James R. Underwood, CEO and General Manager, and **Robert M. Engelbardt**, Executive Vice President, Hicks & Ragland Engineering Co., Inc., USA

Since 1949, rural telecommunications development in the US has been facilitated by financing obtained through the US Department of Agriculture's Rural Electrification Administration (REA) Telephone Loan Program. The speakers examine the financing structure, standards consistency review process, and technical assistance features of the program to draw lessons for developing countries concerned with extending development of telecommunications to rural areas.

4.3.4.6 *Standards Strategies-Key to Profit or Loss?*

Joseph Onufrak, Director-Standards, NYNEX Technology Resources Group (TRG), USA

The speaker discusses the strategic impact of standards development upon business success. The primary objective to successful business planning regarding standards is to establish a linkage between evolving standards, the need for direct involvement, the resources, and the overall goals of the business. He cites examples and includes information on standards setting organizations to show that a global outlook in standards development groups is definitely the trend.

4.3.5 ***Emerging Personal Communication Technology and Applications for the Pacific***

Chair: **Dennis Whiteside**, Director, Southwestern Bell, USA

4.3.5.1 *Open Architecture for Cellular Systems*

Jack M. Scanlon, Corporate Vice President, Motorola, Inc., USA

The first generation of cellular systems was introduced using proprietary architectures that were different for each manufacturer. Second generation cellular architectures are now being introduced coincident with adoption of digital technology at the air interface. The speaker focuses on two digital specifications, GSM and DECT 1800,

both of which specify an entire open systems architecture. The specifications permit, for the first time, mixing of vendor infrastructure components to achieve a complete cellular system that affords operators a new level of vendor independence at competitive prices. Motorola has embraced this open system architecture and is extending it to support other worldwide digital standards. The speaker advocates further evolution of such standards for cost effective implementation of PCN/PCS, to permit sharing of existing PSTN infrastructure, and to reduce PCN/PCS infrastructure cost and implementation intervals. He describes several variations of these concepts that are expected to be tested in 1992.

4.3.5.2 *Cellular Systems Technology: The Narrow Band Development and Digitally Enhanced Cellular Services*

Michael Kotzin and **John Kay**, Group Leader, Applied Systems Engineering, Cellular Infrastructure Division, Radio Telephone Systems Group, Motorola, Inc., USA

Due to rapid subscriber growth, providing adequate cellular capacity has become a critical problem, especially in major metropolitan areas. Several proposed digital solutions are in draft specification stages. The speakers propose a narrowband extension of the existing analog cellular AMPS system, termed NAMPS, to provide a technology bridge between AMPS and future digital systems. The NAMPS proposed system affords immediate spectrum relief as well as a continuous digital messaging system and offers significant service and performance benefits to users and operators alike. As the speakers make clear, the technology has already been tested and proven, and provides an economical and low risk interim solution for which commercial subscriber equipment is now available.

4.3.5.3 *Personal Communications: Potential and Pitfalls*

John A. Gilbert, Vice President: Consulting Services, Lapp-Hancock Associates Limited, Canada

Personal communications networks (PCNs) and services have the potential to change telecommunications during the 1990s as radically as personal computers changed computing in the 1980s. However, a combination of factors are critical to further development of PCNs including the introduction of the more powerful attributes of intelligent networks, wider assignment of personal numbers, significant cost reductions for mobile and fixed terminals, and new perspectives on the assignment of the radio frequency spectrum. The speaker reviews critical challenges to expanding the reach and benefits of PCNs, particularly in developing countries interested in augmenting their telecommunications infrastructure.

4.3.5.4 *TRITIUM: A Strategy for Mobile Communications Satellites for Global Coverage*

George Hrycenko, **Klauss Johannsen**, and **Frank Joyce**, Space Communications Group, Hughes Aircraft Company, USA

Mobile communication service advocates have expressed strong interest in extending capabilities by using lightsats that would feature more advanced technology than traditional geostationary orbit satellites (GSOs) and that would operate from low or intermediate earth orbits (LEOs). Hughes Aircraft, in studying such alternatives, has shown that advanced capabilities can be equally well attained using its TRITIUM GSO mobile satellite system. The speakers present results and conclusions of their study comparing LEO alternatives for mobile communications with service capabilities of Hughes' TRITIUM system.

4.3.5.5 *Standards and the Evolution of Wireless Services*

James C. Hobbs, Chief Strategists - Worldwide Wireless, BellSouth Enterprises, Inc., USA

Continued evolution of wireless networks requires additional attention to timely resolution of standards issues. Agreements on standards are desperately needed in order to allow interconnection of PCNs that in turn will ensure that customers receive the services and functionality they desire regardless of their location. Already, market confusion about digital cellular standards in the US has contributed to significant delays in the availability of digital cellular equipment. The speaker discusses the impact of standards on cellular equipment and services markets and explains BellSouth's strong support for TDMA digital cellular standards, which is based on its experiences in Denmark and New Zealand and the company's other service development efforts.

4.3.6 *Using Telecommunication Tools for Instruction and Research*

Chair: **Terry Charman**, Assistant Director, Telecommunications Strategy, Department of Finance, Australia

4.3.6.1 *Strategies and Models for Instructing and Using Satellite-Based Curriculum*

Pamela S. Pease, Vice President of Programming, TI-IN Network, Inc., USA

Delineating the processes involved in successfully developing distance learning academic courses targeted to high school students and teachers, the speaker draws on models derived from TI-IN Network's six years of experience in the field. Also highlighted are TI-IN's private-public partnerships to facilitate delivery and development of programs, and possible applications for corporate training programs.

4.3.6.2 *Innovation, Education and Research at a Distance: "The Science of Human Nutrition"*

Dian A. Gans, Assistant Professor, Food Science and Human Nutrition, and **Hae K. Okimoto**, Manager of Distance Education, Office of Information Technology, University of Hawaii, USA

The speakers report on the use of the Hawaii interactive television system (HITS) to achieve educational equity throughout the state university system for courses offered as part of the Food Science and Human Nutrition program located at the University of Hawaii-Manoa. They describe use of the system for instruction in the Northern Marianas College, Saipan, and plans to expand program offerings in the future.

4.3.6.3 *Instructional Telecommunication in Alaska: Ten Years Later*

Barry Willis, Director of Statewide Distance Education, University of Alaska System, USA

The speaker reviews the historical, organizational, economic, social, and cultural variables that led to initial interest in widespread use of telecommunications in Alaska for educational delivery. The speaker also discusses the planning and evaluation processes for the state's program, now more than 10 years old.

4.3.6.4 *Satellite-Assisted Distance Learning to Rural Secondary Schools: Saskatchewan Communication Network (SCN)*

E. Lynn Oliver, Manager of Distance Education, Saskatchewan Communications Network, and **F. Barry Brown**, Professor, College of Education, University of Saskatchewan, Canada

The speakers report on the province of Saskatchewan's pilot project to deliver distance learning to high school students in remote communities. The system uses two satellite channels, microwave links, and fiber optic and standard lines to provide secondary course subject and instructional resources to post-secondary institutions and more than 50 learning centers province-wide. The project is viewed as a way of augmenting scarce teaching resources in rural locations where expert instruction in many subject areas is unavailable on account of difficulties in recruiting and maintaining adequate numbers of teachers in remote locations.

4.3.6.5 *Experimental International Language Teaching Between Japan and Australia Using 64/128 KBS Compressed Video via ISDN*

Shigeru Wakamatsu, Professor of Research and Development Division, National Institute of Multimedia Education, Japan, and **Geoff Arger**, Assistant Director of Department of External Studies, The University of New England, Australia

Trials conducted between Japan and Australia during 1991 tested the efficacy of and student responses to videoconference instruction using 64 Kbps and 128 Kbps ISDN transmissions. The speakers report on results of the study and evaluate noticeable differentials in the acceptance rates shown by Japanese and Australian students, respectively.

4.3.7 *Trade in Services*

Chair: **Eugene Newman**, Associate Professor, Telecommunications, SUNY Institute of Technology, USA

4.3.7.1 *Telecommunications and Trade in Services Issues: Recent Trends in International Value Added Networks, GATT, and Bilateral Agreements in the Pacific Basin*

Eugene Newman, Associate Professor of Telecommunications, SUNY Institute of Technology, USA, and **William A. Bollinger**, Information Resource Manager, Lawrence Livermore National Laboratory, USA

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